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COLLINS

overhaul manual

Collins Radio Company

51Y-4/4A
ADF Receiver

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COLLINS

overhaul manual

51Y-4/4A
ADF Receiver

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17	Increase vdcw rating of 110-Hz oscillator capacitor C67.	original	6-1-63
18	Improve bearing performance at 1700 kHz	original	6-1-63
20	Improve damping of loop servo to reduce hunt in bearing indicator system.	2	2-15-65
21	Substitution of more reliable capacitors.	2	2-15-65
22	Improve mounting of handle to front panel (ATR).	2	2-15-65
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21	Substitution of more reliable capacitors.	2	2-15-65
22	Improve mounting of handle to front panel (ATR).	2	2-15-65
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27	Change to silicon transistors in loop and tuning servo amplifiers and audio output circuit.	1	8-1-64
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30	Correction of oscillation in if amplifier	5	12-15-65
31	Replacement of capacitor C74 for greater reliability.	6	4-1-69
32	Resolver replacement.	6	4-1-69
33	Replacement of capacitor C69 for greater reliability.	6	4-1-69
34	Replacement of Scott loop resolver B3 brush assembly.	6	4-1-69
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FOREWORD

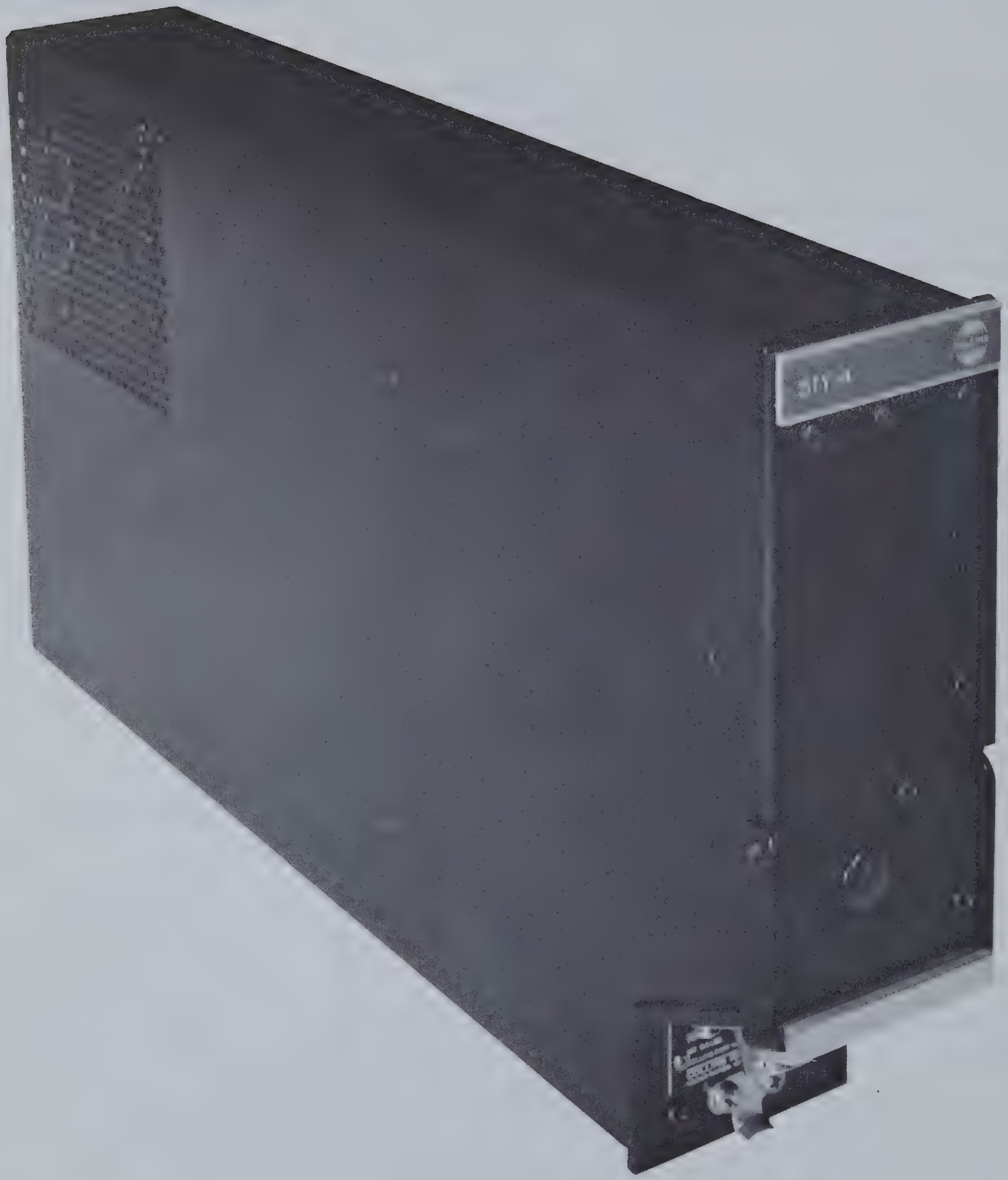
Included within this manual are overhaul instructions with an illustrated parts list prepared in conformance with ATA Specification No. 100 for Manufacturers' Technical Data for the 51Y-4/4A ADF Receiver.

The overhaul instructions are presented in the following sections: description and operation; disassembly; cleaning; inspection/check; repair; assembly; testing; troubleshooting; storage instructions; special tools, fixtures, and test equipment; and an illustrated parts list.

The standards presented in this manual preclude their use for acceptance testing. The information enables the user to restore equipment, which has been removed from service, to proper operating condition.

The following is a list of related publications.

PUBLICATION	COLLINS PART NO.
DF-203 ADF System, Maintenance Manual (with installation data)	523-0755450
614L-8 ADF Control Unit, Overhaul Manual (with illustrated parts list)	523-0755493
179J-5/6/6A/7/8/8A/8B/12 Sense Antenna Couplers, Overhaul Manual (with illustrated parts list)	523-0755502
DF-203 ADF System R-F Cables, Overhaul Manual (with illustrated parts list)	523-0755504
137A-4/5/5A/6/6A/6B Fixed Loop Antennas, Overhaul Manual (with illustrated parts list)	523-0755617
Electromechanical Components, Overhaul Manual	523-0757895



TPI-6756-017

51Y-4/4A ADF Receiver (Typical)
Figure 1

51Y-4/4A ADF Receiver - Description and Operation

1. GENERAL.

Included within this section is the purpose of equipment, the equipment specifications, the equipment description, and theory of operation. Refer to figure 1 for an overall view of the equipment. Figure 2 is a table of equipment covered in this manual.

NOTE: The nomenclature 51Y-4/4A ADF Receiver will be used throughout this manual when the information applies to both the 51Y-4 (serial no. 250 and above) ADF Receiver and the 51Y-4A ADF Receiver. The nomenclature 51Y-4 or 51Y-4A will be used when the information is applicable to only one specific ADF receiver.

NOMENCLATURE	FUNCTION	COLLINS PART NUMBER	DIMENSIONS (inches)			WEIGHT (lb)
			WIDTH	DEPTH	HEIGHT	
51Y-4 ADF Receiver	ADF receiver for DF-203 ADF System (3000-pf sense input capacitance)	522-1836-00	2-1/4	14-5/8	7-5/8	9.2 ±0.5
51Y-4 ADF Receiver	ADF receiver for DF-203 ADF System (3000-pF sense input capacitance) with holddown hook on side of front panel	522-1836-013	2-1/4	14-5/8	7-5/8	9.2 ±0.5
51Y-4A ADF Receiver	ADF Receiver for DF-203 ADF System (150-pf or 270-pf sense input capacitance)	522-2587-00	2-1/4	14-5/8	7-5/8	9.2 ±0.5
51Y-4A ADF Receiver	ADF receiver for DF-203 ADF System (150-pf or 270-pf sense input capacitance) with self-test circuitry	522-2587-013	2-1/4	14-5/8	7-5/8	9.2 ±0.5

Table of Equipment Covered
Figure 2

2. PURPOSE OF EQUIPMENT.

The purpose of the 51Y-4/4A ADF Receiver is to receive radio signals from 190 to 1750 kHz in any of three modes. The 51Y-4/4A is the principal component of the DF-203 ADF System. In ADF mode, the DF-203 system automatically determines the direction to the station. The DF-203 also may be used as a manual direction finder by selecting the LOOP mode or as a conventional lf and broadcast-band aural receiver in ANT mode. The 51Y-4/4A, in any mode, provides an aural output of any audio modulation carried on the received rf signal. The 51Y-4/4A receives rf information from a fixed loop antenna, a sense antenna, and provides bearing information for an RMI (radio magnetic indicator) or similar type of indicator. A 614L-8 ADF Control Unit provides frequency selection and other control facilities. The difference between the 51Y-4 and 51Y-4A is the capacitance required at the sense antenna input. The 51Y-4 requires 3000 pf while the 51Y-4A requires either 150 pf or 270 pf.

3. EQUIPMENT SPECIFICATIONS.

The 51Y-4/4A ADF Receiver specifications are listed in figure 3. The designation and quantity of each type of semiconductor used in the 51Y-4/4A ADF Receiver is listed in figure 4.

CHARACTERISTIC	SPECIFICATION
ARINC compliance	Characteristic 550.
Specification	51Y-4: FAA TSO C41a 51Y-4A: FAA TSO C41b, Category $\frac{A}{D}$ABAAAX Class A
Weight	9.2 ±0.5 lb
Dimensions	
Depth	14-5/8 in.
Width	2-1/4 in.
Height	7-5/8 in.
ARINC size designation	1/4 ATR short.
Environment	
Temperature	
Storage	-65 °C (-85 °F) to +85 °C (+185 °F).
Operating without cooling	-54 °C (-65 °F) to +55 °C (+131 °F).
Operating with cooling	-54 °C (-65 °F) to +65 °C (+149 °F).

Equipment Specifications (Sheet 1 of 3)
Figure 3

CHARACTERISTIC	SPECIFICATION		
Humidity	Up to 95% relative humidity at +50 °C (+122 °F) for 48 hr.		
Altitude	45,000 ft max.		
Shock			
51Y-4/4A in 390D-11 Shockmount	15 g operating, 30 g impact.		
51Y-4/4A in 390R-6A Rigid Mount	6 g operating, 15 g impact.		
Frequency range	190 kHz to 1750 kHz covered in three bands.		
Frequency accuracy	Band 1 - 190-400 kHz		1.5 kHz
	Band 2 - 400-840 kHz		2.5 kHz
	Band 3 - 840-1750 kHz		5.0 kHz
Bearing accuracy	2 degrees.		
Aural sensitivity (Field strength required to produce a signal-plus-noise-to-noise ratio of at least 6 db with a minimum audio output of 20 mw with 30 percent modulation on.)	51Y-4		51Y-4A
ADF			
200 kHz	55 uv/m		70 uv/m
1700 kHz	20 uv/m		25 uv/m
Antenna		270 pf	150 pf
200 kHz	30 uv/m	50 uv/m	40 uv/m
1700 kHz	15 uv/m	22 uv/m	18 uv/m
Loop			
200 kHz	100 uv/m		100 uv/m
1700 kHz	30 uv/m		30 uv/m
Maximum time to obtain bearing	7 sec.		
Intermediate frequency	142.5 kHz.		

Equipment Specifications (Sheet 2 of 3)
Figure 3

CHARACTERISTIC	SPECIFICATION
Total bandwidth	
51Y-4	Bandwidth at 6 db is 2.5 to 3.5 kHz (at frequency of 190 to 1750 kHz). Bandwidth at 60 db is 9.0 to 11.0 kHz (at frequency of 190 to 1750 kHz).
51Y-4A	Bandwidth at 6 db is 2.7 to 3.8 kHz (at frequency of 190 to 1750 kHz). Bandwidth at 60 db is 8.0 to 11.0 kHz (at frequency of 190 to 1750 kHz).
Power consumption including 614L-8 ADF Control Unit and indicator	
27.5 volts dc	19 watts.
26 volts ac	0.53 amp, 0.38 power factor.
Susceptibility to spurious radiation	In accordance with the requirements of RTCA paper 120-61/DO-108.
Bearing output	Will drive 1, 2, or 3 indicators in accordance with the requirements of ARINC Characteristic 530, Airborne ADF Systems.
Audio output	Not less than 100 mw into a 600-ohm load with input of 1000 uv/m modulated 30 percent at 400 Hz.

Equipment Specifications (Sheet 3 of 3)
Figure 3

(Figure 4 (sheet 1 of 2) deleted.)

(Figure 4 (sheet 2 of 2) deleted.)

4. EQUIPMENT DESCRIPTION.

A. Mechanical.

The 51Y-4/4A ADF Receiver is housed in a 1/4 ATR short case and weights 9.8 pounds maximum. The internal parts of the 51Y-4/4A are protected by a removable dust cover. Five surfaces of the chassis are exposed when the dust cover is removed. Access to the sixth surface of the chassis (located behind the front panel) can be gained from either side of the receiver unit. The chassis of the 51Y-4/4A ADF Receiver is a partially closed aluminum framework which is fastened directly to the front panel of the receiver unit. A gearcase physically divides the chassis into two sections and electrically isolates the rf circuits (located in the front section) from the servo system and power supply (located in the rear section).

The rear section of the chassis is hinged and may be folded back for access to components on the rear chassis. The front section of the chassis supports several subchassis in addition to a ganged variable tuning capacitor. Each subchassis is secured by screws and can be removed for repair.

Wiring in the 51Y-4/4A is point to point. Capacitors and resistors are mounted on Teflon supports. To facilitate maintenance, low-power transistors that do not require heat sinks are retained in sockets.

B. Electrical.

The 51Y-4 and 51Y-4A ADF Receivers are similar with the exception of the capacitance required at the sense antenna input. The 51Y-4 ADF Receiver requires approximately 3000 pf of capacitance at the sense antenna input. The 51Y-4A ADF Receiver requires either a 270-pf sense capacitance when the sense antenna is connected to pin A of the sense antenna connector, or a 150-pf sense capacitance when the sense antenna is connected to pin F of the sense antenna connector. The combined capacitance of the sense antenna and the cable capacitance (and the sense antenna coupler when used) must be matched with the capacitance of the 51Y-4/4A ADF Receiver.

The 51Y-4A ADF Receiver (Collins part number 522-2857-013) is equipped with a self-test circuit that can be activated by the CW-VOICE-TEST switch on the 614L-8 ADF Control Unit (Collins part number 522-2357-024).

The 51Y-4/4A ADF Receiver is a single-conversion superheterodyne low-frequency and broadcast-band receiver. The 51Y-4/4A circuits include two rf amplifiers, a 5-stage if. amplifier, a 3-stage audio amplifier, and a 2-stage agc amplifier.

The 51Y-4/4A is tunable from 190 to 1750 kHz in three bands. An electrically controlled multisection combined band/mode switch selects the tank and rf transformer circuits for each band and makes the proper connections for each mode of operation. A multisection air-dielectric variable capacitor controlled by a servo motor tunes the 51Y-4/4A in each band. The 51Y-4/4A has two antenna inputs; a loop antenna input and a sense antenna input. During ANT mode of operation, the loop antenna input circuitry is disabled, and the 51Y-4/4A operates as a conventional low-frequency and broadcast-band radio receiver. During LOOP mode of operation, the sense antenna input is terminated with a fixed capacitor, and the only rf input is through a resolver from the 137A-( ) Fixed Loop Antenna. The resolver rotor is driven by a servo motor which is controlled electrically from the 614L-8 ADF Control Unit. During ADF mode of operation, a phase comparison of signals from the resolver rotor and the sense antenna determines whether the resolver rotor is to the left or right of the null position. The position of the resolver rotor during ADF mode operation corresponds to the relative bearing of the station. A synchro transmitter geared to the resolver rotor in the 51Y-4/4A supplies as many as three bearing indicators in the aircraft with bearing information.

A regulated power supply, temperature-compensating thermistors, and hermetically sealed if. transformers ensure frequency stability, and reduce the effects of ambient environmental conditions on the performance of the 51Y-4/4A. ADF performance is improved by the use of a synchronous filter circuit which rejects undesirable modulation components. In addition, critical voltages are regulated to compensate for line-voltage variations between 20 and 32 volts. All circuitry is protected against damage resulting from voltage transients between -40 and +80 volts. The 51Y-4/4A is made insensitive to large variations of input signal levels by a 2-storage agc amplifier which controls the gain of the rf amplifier and the first and second if. amplifiers.

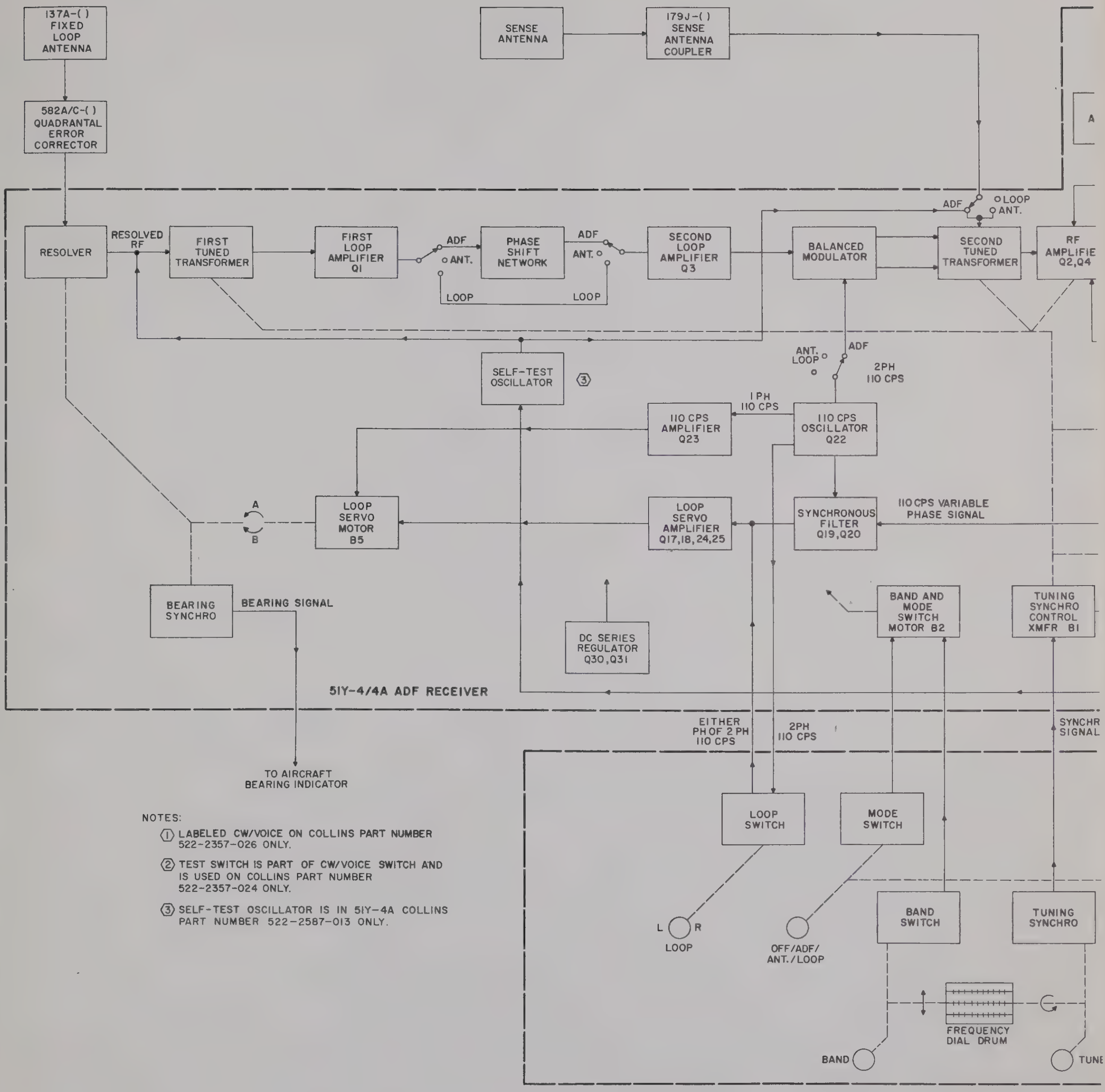
5. THEORY OF OPERATION.

A. General.

The following paragraphs describe the circuit theory of operation for the 51Y-4/4A. The 51Y-4/4A is the principal component of the DF-203 ADF System. Block diagram theory of the DF-203 ADF System is given in paragraph 5.B with a complete system block diagram shown in figure 5. Paragraph 5.B describes the operation of each section of the 51Y-4/4A in all modes. Functional theory is given in paragraph 5. C. The functional theory is subdivided into three separate discussions, each covering one of the three modes of operation. A complete description of each circuit of the 51Y-4/4A is given in paragraph 5.D, the detailed theory of operation.

B. Block Diagram Theory.

The rf signal is coupled from the directional 137A-( ) Fixed Loop Antenna through the 582A/C-( ) Quadrantal Error Corrector to the rf resolver in the 51Y-4/4A (refer to figure 5). The angular position of the resolver rotor determines the amplitude and phase of the loop rf signal reaching the first tuned transformer. The first tuned transformer is selected by the band/mode switch motor from three transformers that cover the three frequency bands of the 51Y-4/4A. One transformer covers the range from 190 to 400 kHz. A second covers the range from 400 to 840 kHz. The third covers frequencies from 840 to 1750 kHz. The loop rf signal is amplified in the first loop amplifier Q1. A 90-degree phase shift is applied to the output of the first loop amplifier in ADF mode so the loop antenna and sense antenna rf signals are exactly in phase or 180 degrees out of phase. In LOOP mode, the phase-shift network is bypassed to avoid attenuation since the phase of the loop signal has no effect on operation in LOOP mode. The loop signal is disconnected from the remaining circuits at the switch preceding the phase-shift network in ANT mode since only the sense antenna signal is used in ANT mode. The loop signal is then amplified in the second loop amplifier in ADF and LOOP modes. In the ADF mode, the loop signal is modulated at a 110-Hz rate in the balanced modulator. The balanced modulator output is a double-sideband suppressed-carrier signal (two 110-Hz sidebands). The 110-Hz gating


137A-( ) FIXED LOOP ANTENNA
582A/C-( ) QUADRANTAL ERROR CORRECTOR
SENSE ANTENNA
179J-( ) SENSE ANTENNA COUPLER
A
ADF
LOOP
ANT.
RESOLVER
RESOLVED RF
FIRST TUNED TRANSFORMER
FIRST LOOP AMPLIFIER Q1
ADF
ANT.
LOOP
PHASE SHIFT NETWORK
ADF
ANT.
LOOP
SECOND LOOP AMPLIFIER Q3
BALANCED MODULATOR
SECOND TUNED TRANSFORMER
RF AMPLIFIE Q2,Q4
SELF-TEST OSCILLATOR ③
ANT. LOOP
ADF
2PH 110 CPS
1 PH 110 CPS
110 CPS AMPLIFIER Q23
110 CPS OSCILLATOR Q22
A
B
LOOP SERVO MOTOR B5
LOOP SERVO AMPLIFIER Q17,18,24,25
SYNCHRONOUS FILTER Q19,Q20
110 CPS VARIABLE PHASE SIGNAL
BEARING SYNCHRO
BEARING SIGNAL
DC SERIES REGULATOR Q30,Q31
BAND AND MODE SWITCH MOTOR B2
TUNING SYNCHRO CONTROL XMFR B1
51Y-4/4A ADF RECEIVER
EITHER PH OF 2 PH 110 CPS
2PH 110 CPS
SYNCHR SIGNAL
TO AIRCRAFT BEARING INDICATOR
LOOP SWITCH
MODE SWITCH
BAND SWITCH
TUNING SYNCHRO
L
R
LOOP
OFF/ADF/ANT./LOOP
FREQUENCY DIAL DRUM
BAND
TUNE

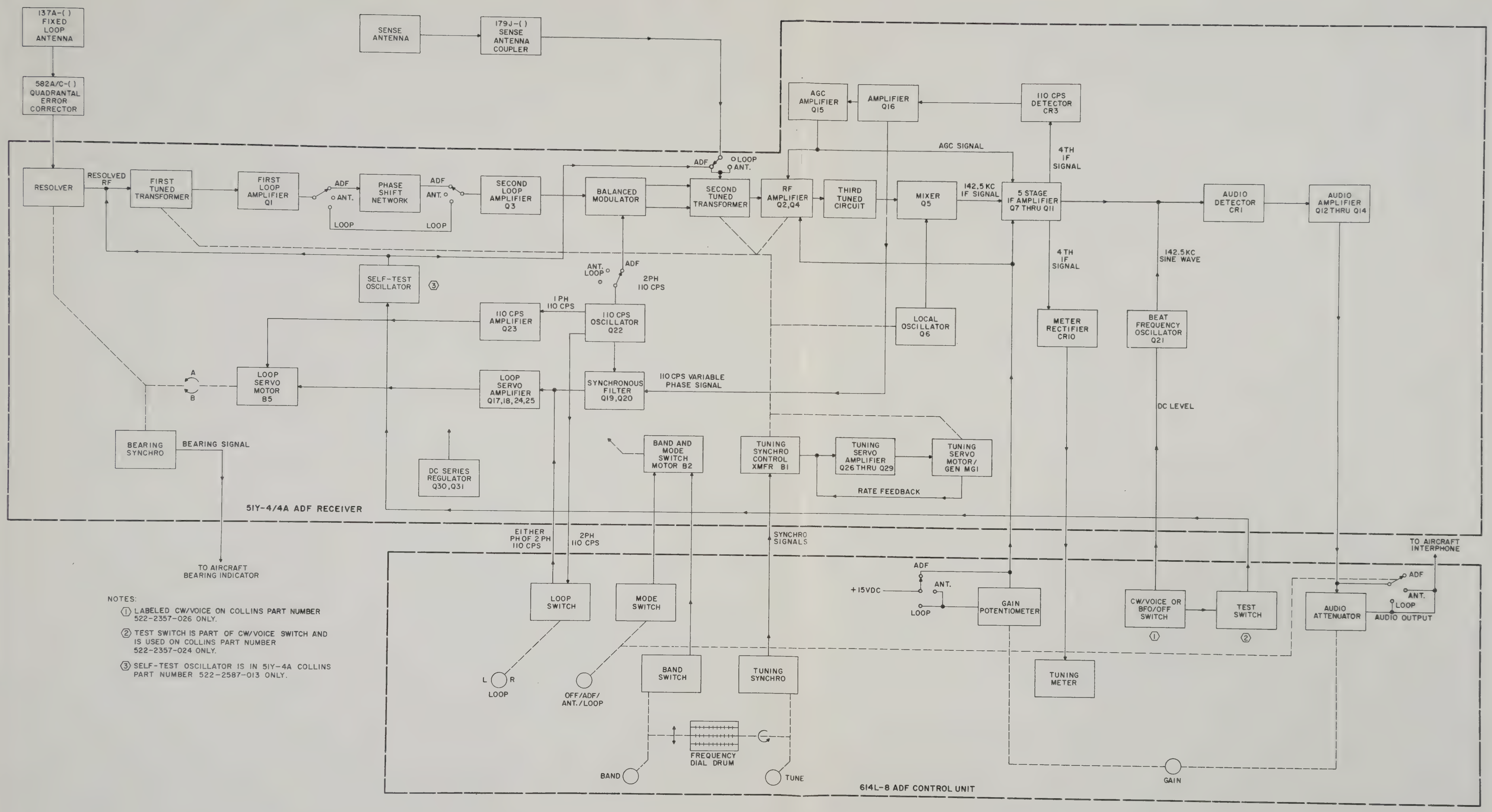
NOTES:

① LABELED CW/VOICE ON COLLINS PART NUMBER 522-2357-026 ONLY.

② TEST SWITCH IS PART OF CW/VOICE SWITCH AND IS USED ON COLLINS PART NUMBER 522-2357-024 ONLY.

③ SELF-TEST OSCILLATOR IS IN 51Y-4A COLLINS PART NUMBER 522-2587-013 ONLY.

51Y-4/4A ADF Receiver (with Associated Equipment), Detailed Block Diagram
Figure 5


137A-( ) FIXED LOOP ANTENNA
582A/C-( ) QUADRANTAL ERROR CORRECTOR
SENSE ANTENNA
179J-( ) SENSE ANTENNA COUPLER
RESOLVER
RESOLVED RF
FIRST TUNED TRANSFORMER
FIRST LOOP AMPLIFIER Q1
ADF
ANT.
LOOP
PHASE SHIFT NETWORK
SECOND LOOP AMPLIFIER Q3
BALANCED MODULATOR
SECOND TUNED TRANSFORMER
RF AMPLIFIER Q2,Q4
THIRD TUNED CIRCUIT
MIXER Q5
142.5 KC IF SIGNAL
5 STAGE IF AMPLIFIER Q7 THRU Q11
AUDIO DETECTOR CR1
AUDIO AMPLIFIER Q12 THRU Q14
AGC AMPLIFIER Q15
AMPLIFIER Q16
110 CPS DETECTOR CR3
AGC SIGNAL
4TH IF SIGNAL
SELF-TEST OSCILLATOR ③
ANT. LOOP
2PH 110 CPS
1 PH 110 CPS
110 CPS AMPLIFIER Q23
110 CPS OSCILLATOR Q22
LOCAL OSCILLATOR Q6
METER RECTIFIER CR10
142.5KC SINE WAVE
BEAT FREQUENCY OSCILLATOR Q21
A
B
LOOP SERVO MOTOR B5
LOOP SERVO AMPLIFIER Q17,18,24,25
SYNCHRONOUS FILTER Q19,Q20
110 CPS VARIABLE PHASE SIGNAL
DC LEVEL
BEARING SYNCHRO
BEARING SIGNAL
DC SERIES REGULATOR Q30,Q31
BAND AND MODE SWITCH MOTOR B2
TUNING SYNCHRO CONTROL XMFR B1
TUNING SERVO AMPLIFIER Q26 THRU Q29
TUNING SERVO MOTOR/GEN MG1
RATE FEEDBACK
51Y-4/4A ADF RECEIVER
EITHER PH OF 2 PH 110 CPS
2PH 110 CPS
SYNCHRO SIGNALS
TO AIRCRAFT INTERPHONE
TO AIRCRAFT BEARING INDICATOR
+15VDC
GAIN POTENTIOMETER
CW/VOICE OR BFO/OFF SWITCH ①
TEST SWITCH ②
AUDIO ATTENUATOR
AUDIO OUTPUT
LOOP SWITCH
MODE SWITCH
L R
LOOP
OFF/ADF/ANT./LOOP
BAND SWITCH
TUNING SYNCHRO
TUNING METER
FREQUENCY DIAL DRUM
BAND
TUNE
GAIN
614L-8 ADF CONTROL UNIT

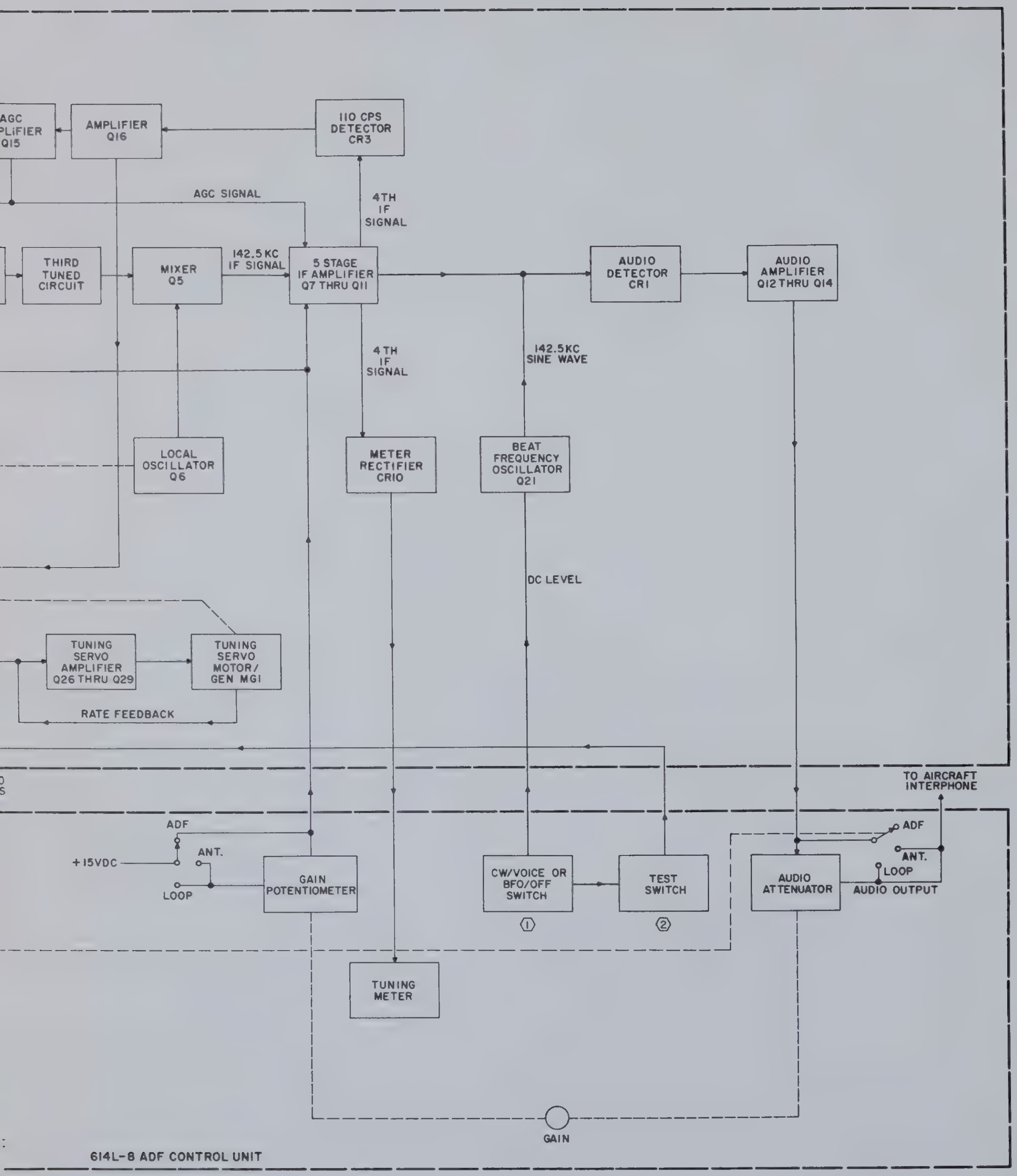
NOTES:

① LABELED CW/VOICE ON COLLINS PART NUMBER 522-2357-026 ONLY.

② TEST SWITCH IS PART OF CW/VOICE SWITCH AND IS USED ON COLLINS PART NUMBER 522-2357-024 ONLY.

③ SELF-TEST OSCILLATOR IS IN 51Y-4A COLLINS PART NUMBER 522-2587-013 ONLY.

51Y-4/4A ADF Receiver (with Associated Equipment), Detailed Block Diagram
Figure 5


AGC
PLIFIER
Q15
AMPLIFIER Q16
110 CPS DETECTOR CR3
AGC SIGNAL
4TH IF SIGNAL
THIRD TUNED CIRCUIT
MIXER Q5
142.5 KC IF SIGNAL
5 STAGE IF AMPLIFIER Q7 THRU Q11
AUDIO DETECTOR CR1
AUDIO AMPLIFIER Q12 THRU Q14
4 TH IF SIGNAL
142.5KC SINE WAVE
LOCAL OSCILLATOR Q6
METER RECTIFIER CR10
BEAT FREQUENCY OSCILLATOR Q21
DC LEVEL
TUNING SERVO AMPLIFIER Q26 THRU Q29
TUNING SERVO MOTOR/ GEN MG1
RATE FEEDBACK
TO AIRCRAFT INTERPHONE
ADF
ANT.
+15VDC
LOOP
GAIN POTENTIOMETER
CW/VOICE OR BFO/OFF SWITCH
①
TEST SWITCH
②
AUDIO ATTENUATOR
ADF
ANT.
LOOP
AUDIO OUTPUT
TUNING METER
GAIN
614L-8 ADF CONTROL UNIT

voltage applied to the balanced modulator is provided by the 110-Hz oscillator. The loop signal bypasses the balanced modulator in LOOP mode and is applied directly to the second tuned transformer.

The sense signal originating in the sense antenna is transferred through the 179J-( ) Sense Antenna Coupler (51Y-4 only) to the second tuned transformer in ADF and ANT modes. The sense signal is not used in LOOP mode. The loop and sense signals are mixed in the second tuned transformer in ADF mode. The combined sense antenna carrier signal and double-sideband suppressed carrier loop signal forms an amplitude-modulated signal which has a modulation frequency of 110 Hz, with depth of modulation determined by the angular difference between the resolver rotor position and its null position, and with the phase of the modulation envelope determined by the direction from the null position of the resolver rotor. The sense signal is the only signal reaching the second tuned transformer in the ANT mode.

The combined sense and loop antenna signal is amplified in the rf amplifier and applied through double-tuned circuits to the mixer where the signal is mixed with the output of a CW local oscillator. The local oscillator frequency is always 142.5 kHz higher than the signal from the rf amplifier so the mixer output is always 142.5 kHz. This is the intermediate frequency. The five if. amplifier stages amplify this signal and the audio sidebands but reject all other frequencies. The fifth if. stage drives an audio detector. The audio signal is amplified in an audio amplifier which is connected to the 614L-8 ADF Control Unit.

In ADF mode, the DF-203 audio output level is controlled by an audio attenuator in the 614L-8. The audio attenuator is bypassed in ANT and LOOP modes since 51Y-4/4A gain is controlled at the rf and if. stages by a dc bias voltage from the gain potentiometer in the 614L-8. In ADF mode, the 614L-8 gain potentiometer does not affect rf and if. gain.

The output of the fourth if. amplifier stage is demodulated with a diode detector and applied to the input of the agc amplifier and loop servo amplifier.

The dc component of the demodulated signal is amplified in the 2-stage agc amplifier to provide the agc voltage which is applied to the bases of the agc-controlled stages.

Rf and if. gain is varied by the agc amplifier in all modes. As the rf signal at the antenna increases, the increase in if. input to the agc amplifier reduces gain of the rf and if. stages. This prevents rapid changes in audio output and eliminates the possibility of distortion from overloading.

The 110-Hz ac signal from the detector is amplified in the loop servo amplifier, shifted in phase, and applied to the control winding of the loop servo motor. A synchronous filter in the low-level loop servo amplifier provides a very narrow passband. The center frequency of the passband is automatically synchronized with the 110-Hz oscillator frequency. Audio signals other than 110 Hz are rejected to improve ADF performance. In ANT and LOOP mode, the 110-Hz detector signal is disconnected from the loop servo motor. The second winding is energized by an amplified 110-Hz reference signal from the 110-Hz oscillator. The loop servo motor is geared to the resolver rotor. This motor can rotate in either direction and always drives a null in the figure-eight rotor pattern toward the signal source. Positioning of the rotor null toward the signal direction is accomplished automatically in ADF mode only. In LOOP mode, the loop servo motor and the rotor position are controlled manually from the LOOP L-R switch in the 614L-8. The rotor position is transferred to an external indicator by the bearing synchro system.

The beat-frequency oscillator (bfo) injects a 142.5-kHz signal into the if. signal path. This signal creates an audio beat frequency when mixed with the 142.5-kHz if. that is adjusted for a zero beat to attain proper tuning. The bfo may be switched on or off by the CW/VOICE/(TEST) or the BFO/OFF switch on the 614L-8.

The fourth if. amplifier signal is also applied to the meter rectifier which causes the tuning meter to defect in proportion to the if. signal strength.

The band and mode switches in the 614L-8 control the position of the band/mode switch of the 51Y-4/4A through the band/mode-switch motor. The band switch selects the proper rf transformers for each of the three bands into which the tuning range is divided. The mode switch interconnects and energizes the various circuits properly for each mode of operation. The band/mode-switch motor rotates only one switch which has many wafers, and provides both mode-switching and band-switching functions.

The 51Y-4/4A tuning capacitor is positioned from the 614L-8 by a tuning synchro system. The tuning synchro transmitter is connected mechanically to the tuning knob and dial of the 614L-8. The synchro signal is transferred to the tuning synchro control transformer in the 51Y-4/4A. The control transformer output, with amplitude and phase dependent upon rotor position, is amplified and applied to the variable phase winding of the tuning servomotor. This motor is geared to the control transformer rotor which is driven to a null position by the motor. The motor also is geared to the tuning capacitor which is then driven with the control transformer rotor to the position selected in the 614L-8.

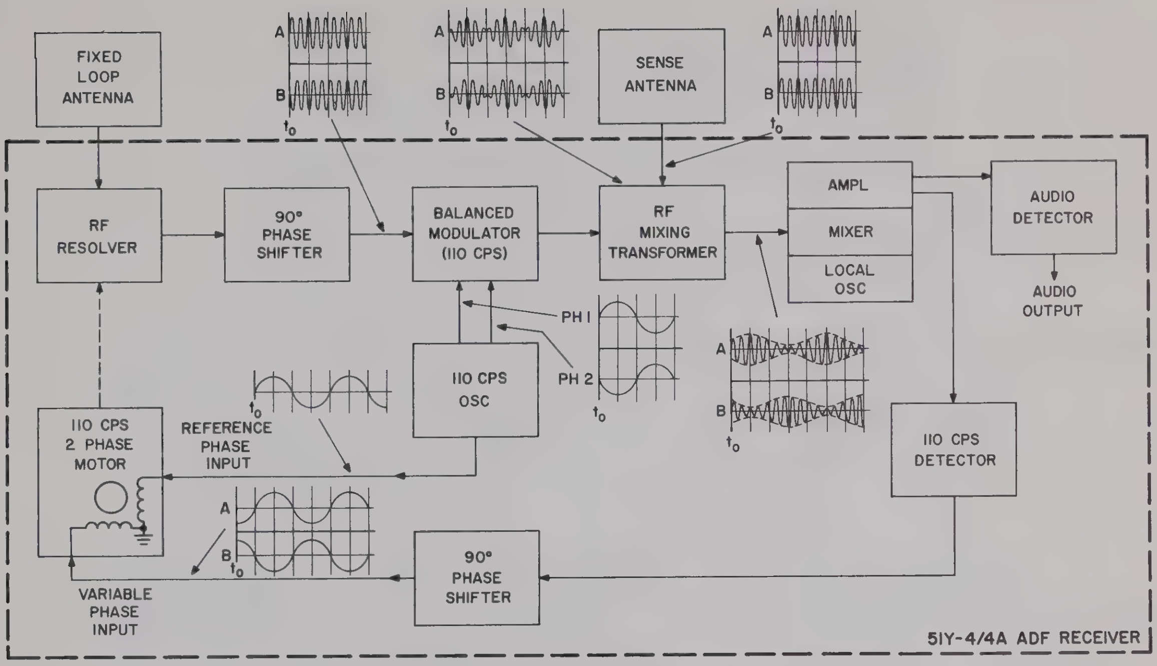
The 51Y-4A (Collins part number 522-2587-013) contains a crystal controlled self-test oscillator. This oscillator provides a 100-kHz signal that is used to simulate the signals from the fixed loop and sense antennas. The CW-VOICE-TEST switch on the 614L-8 activates the self-test oscillator and turns on the BFO. The receiver can then be tuned to a harmonic of the self-test oscillator for a performance check.

The dc supply voltage for the 51Y-4/4A transistors is provided by a voltage regulator. The voltage regulator receives power from the +27.5-volt dc aircraft primary power source, and provides regulated +16-volt dc and +15-volt dc outputs.

C. Functional Theory.

(1) ADF Mode.

The 51Y-4/4A receives a signal from both the 137A-( ) Fixed Loop Antenna and from the sense antenna in the ADF mode (refer to figure 6). The rf signal received at the 137A-( ) Fixed Loop Antenna is generated with the same relative direction and magnitude by the stator coils within the rf resolver of the 51Y-4/4A (refer to figure 7). The receiving pattern of a loop coil is a figure-eight. Maximum voltage is induced into the loop coil when the signal source is perpendicular to the coil axis. Minimum voltage is induced when the signal source is on the

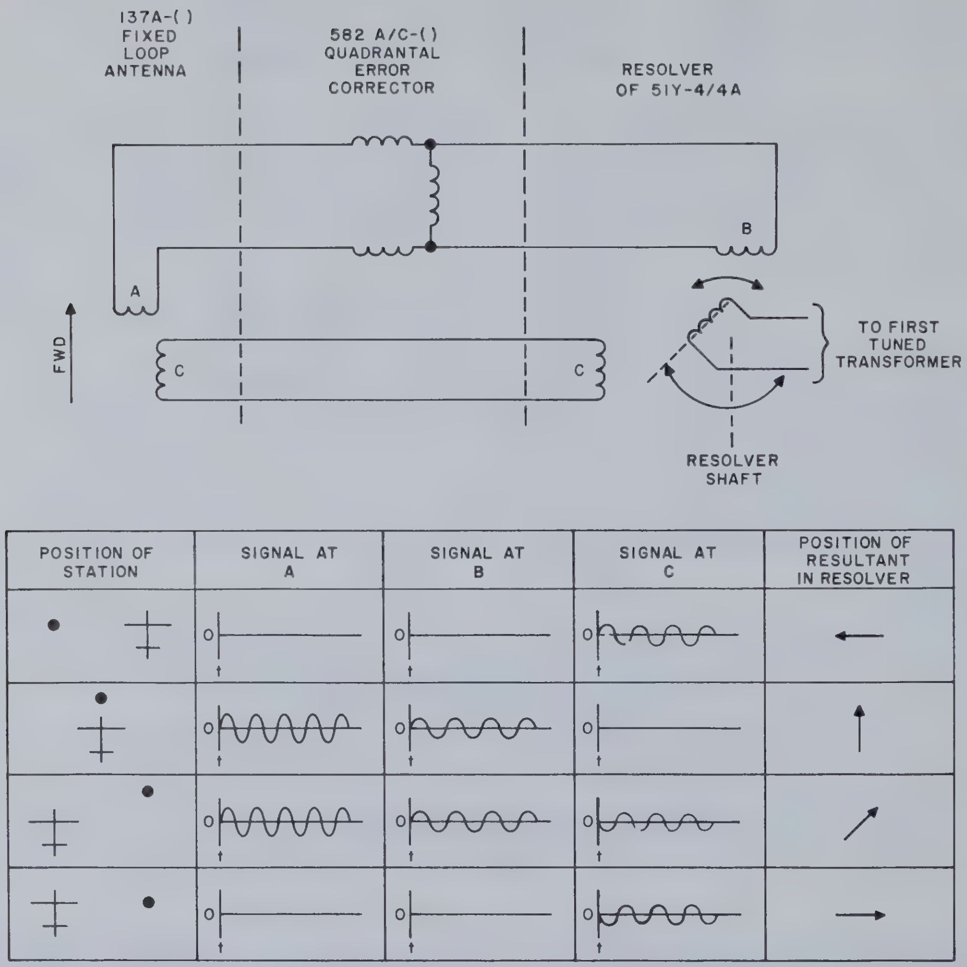

FIXED LOOP ANTENNA
A
B
t0
A
B
t0
SENSE ANTENNA
A
B
t0
RF RESOLVER
90° PHASE SHIFTER
BALANCED MODULATOR (110 CPS)
RF MIXING TRANSFORMER
AMPL
MIXER
LOCAL OSC
AUDIO DETECTOR
AUDIO OUTPUT
PH 1
PH 2
t0
110 CPS OSC
t0
A
B
t0
110 CPS 2 PHASE MOTOR
REFERENCE PHASE INPUT
A
B
t0
110 CPS DETECTOR
90° PHASE SHIFTER
VARIABLE PHASE INPUT
51Y-4/4A ADF RECEIVER

NOTE:
WAVEFORM "A" PRESENT WHEN TRUE RESOLVER ROTOR NULL IS AT ANGLES OF 0° TO 180° FROM RF RESULTANT; WAVEFORM "B" PRESENT AT ANGLES OF 180° TO 360°.

ADF Mode, Functional Block Diagram
Figure 6

coil axis (null points). There is a 180-degree phase difference between voltage induced into opposite lobes of the figure-eight pattern. Thus, as a null point is crossed, the phase of the rf output shifts 180 degrees. A signal source directly off either wing of the aircraft will induce maximum voltage into coil C of the 137A-( ) Fixed Loop Antenna and minimum voltage into coil A (refer to figure 7). Maximum voltage will then be generated by a stator coil C in the resolver. Since a coil has a figure-eight pattern, maximum voltage will be generated on a line perpendicular to the coil axis. The resultant signal in the resolver will have the same relative direction as the original signal source. When the signal source is directly in front of the aircraft, maximum signal will be induced into coil A of the 137A-( ) and transferred to stator coil B of the resolver. The resultant signal at the resolver rotor will have a relative direction of 0 degree as did the original signal source. If the signal source is at a bearing of 45 degrees from the aircraft fore-aft axis, equal voltage will be induced into loop antenna coils A and C and be transferred to stator coils B and C. The result will be a composite of the signals from stator coils B and C and will have an apparent relative source direction of 45 degrees. Therefore, for any direction, the 137A-( ) coils and the resolver stator coils generate a signal within the resolver that has the same relative direction as the original signal source at the 137A-( ).

The 582A/C-( ) Quadrantal Error Corrector is inserted into the wires connecting one pair of coils for the 137A-( ) to the 51Y-4/4A resolver stator. This attenuates

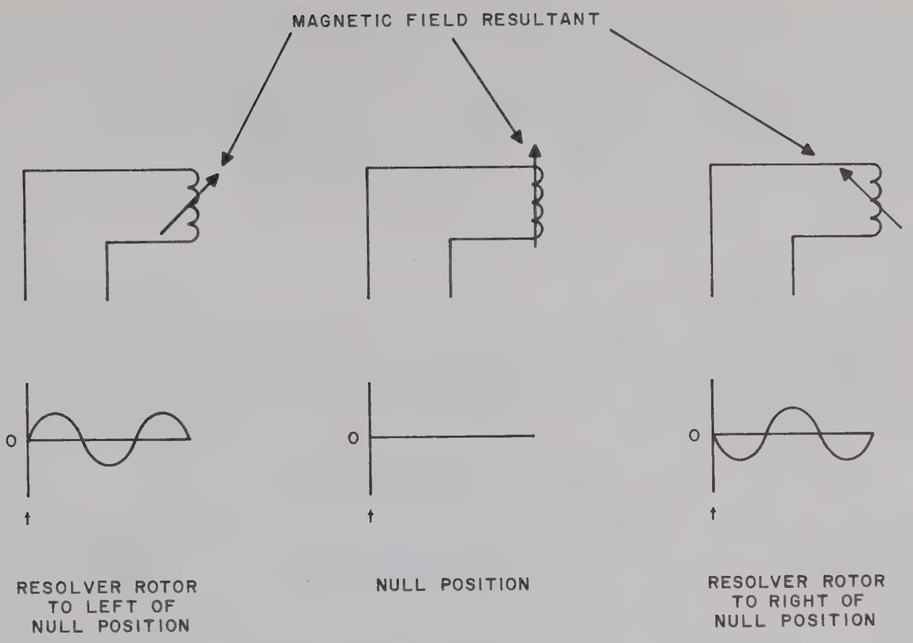

137A-( )
FIXED
LOOP
ANTENNA
582 A/C-( )
QUADRANTAL
ERROR
CORRECTOR
RESOLVER
OF 51Y-4/4A
B
A
FWD
C
C
TO FIRST
TUNED
TRANSFORMER
RESOLVER
SHAFT
POSITION OF
STATION
SIGNAL AT
A
SIGNAL AT
B
SIGNAL AT
C
POSITION OF
RESULTANT
IN RESOLVER
0

Operation of 137A-( ) Fixed Loop Antenna with Resolver
Figure 7

the signal from one pair of coils, thus correcting the error introduced by the bending of the incoming signals toward a path parallel to the fore-aft aircraft axis.

The 51Y-4/4A resolver functions as a miniature rotating loop in receiving the resultant rf signal (refer to figure 8). The receiving pattern of the rotor is a figure-eight, and the phase of the rf output shifts 180 degrees as the null points are crossed.

After amplification and phase shifting, the loop signal from the resolver rotor is balance modulated by the voltage from the 110-Hz oscillator as shown in figure 6 (refer to figure 9). The loop rf carrier signal is applied to one end of a grounded center-tap transformer primary during half of the cycle of the 110-Hz modulating signal and to the opposite end of the transformer primary during the second half of the cycle. The carrier signal in each side of the grounded center-tap transformer primary is equal in magnitude but 180 degrees out of phase and will cancel


MAGNETIC FIELD RESULTANT
O
t
O
t
O
t
RESOLVER ROTOR TO LEFT OF NULL POSITION
NULL POSITION
RESOLVER ROTOR TO RIGHT OF NULL POSITION

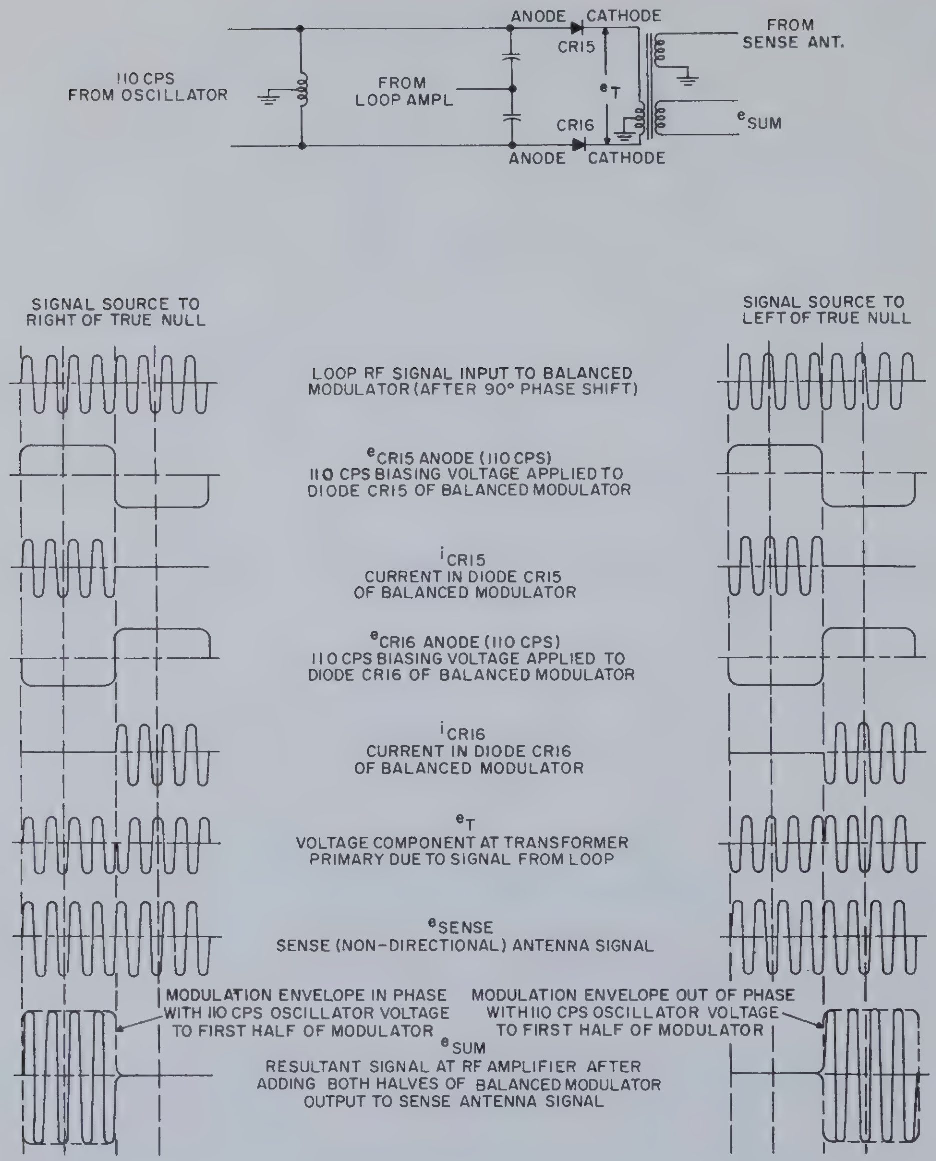
Resolver Output
Figure 8

giving a double-sideband suppressed-carrier signal. The sense antenna signal is induced into the transformer secondary through a third winding. Since the non-directional sense signal does not shift phase, the sense and loop signals add during half of the modulating cycle, then subtract during the other half-cycle. The output from the transformer secondary thus has a 100-Hz modulated envelope.

If the aircraft changes position so that the resultant rf within the resolver reaches the rotor on the opposite side of the resolver axis, the loop rf signal shifts phase 180 degrees. When half of the 110-Hz modulating cycle during which the loop and sense rf voltages add and the half in which they subtract are interchanged, the resulting 110-Hz modulation envelope then shifts phase 180 degrees.

The 2-phase loop servomotor must be excited by two 110-Hz voltages that are 90 degrees out of phase. One winding is excited by an amplified reference voltage from the 110-Hz oscillator. The second winding is driven by the detected and amplified signal from the 110-Hz modulation envelope from the balanced modulator. The signal from the 110-Hz detector is phase shifted 90 degrees in the loop servo amplifier so that the variable-phase detected voltage in the control winding either leads or lags the reference voltage by 90 degrees depending on the phase of the loop rf. The loop servo motor then serves as a phase detector, rotating in one direction when the variable phase leads the reference phase and rotating in the opposite direction when the variable phase lags the reference phase.

The loop servo motor is geared to the resolver rotor. As the motor rotates, the resolver is driven toward one of the two nulls. As the rotor approaches the null,


ANODE
CATHODE
CR15
FROM SENSE ANT.
110 CPS FROM OSCILLATOR
FROM LOOP AMPL
e_T
CR16
e_{SUM}
ANODE
CATHODE
SIGNAL SOURCE TO RIGHT OF TRUE NULL
SIGNAL SOURCE TO LEFT OF TRUE NULL
LOOP RF SIGNAL INPUT TO BALANCED MODULATOR (AFTER 90° PHASE SHIFT)
e_{CR15} ANODE (110 CPS)
110 CPS BIASING VOLTAGE APPLIED TO DIODE CR15 OF BALANCED MODULATOR
i_{CR15}
CURRENT IN DIODE CR15 OF BALANCED MODULATOR
e_{CR16} ANODE (110 CPS)
110 CPS BIASING VOLTAGE APPLIED TO DIODE CR16 OF BALANCED MODULATOR
i_{CR16}
CURRENT IN DIODE CR16 OF BALANCED MODULATOR
e_T
VOLTAGE COMPONENT AT TRANSFORMER PRIMARY DUE TO SIGNAL FROM LOOP
e_{SENSE}
SENSE (NON-DIRECTIONAL) ANTENNA SIGNAL
MODULATION ENVELOPE IN PHASE WITH 110 CPS OSCILLATOR VOLTAGE TO FIRST HALF OF MODULATOR
MODULATION ENVELOPE OUT OF PHASE WITH 110 CPS OSCILLATOR VOLTAGE TO FIRST HALF OF MODULATOR
e_{SUM}
RESULTANT SIGNAL AT RF AMPLIFIER AFTER ADDING BOTH HALVES OF BALANCED MODULATOR OUTPUT TO SENSE ANTENNA SIGNAL

Operation of Balanced Modulator
Figure 9

the loop rf voltage and therefore the percentage modulation from the balanced modulator is reduced. The variable phase voltage from the 110-Hz detector is reduced and the motor slows down. When the null is reached, the loop rf voltage from the resolver drops to zero, and the 110-Hz modulation envelope cannot develop in the balanced modulator and transformer. When no modulation can be detected by the 110-Hz detector, no voltage is present in the control winding of the motor. The motor and resolver rotor do not rotate until the direction of the resultant rf in the resolver changes. If the rotor revolves past the null, the loop rf voltage and the phase of the resulting 110-Hz variable-phase voltage shifts 180 degrees. The loop servo motor then changes direction and drives the rotor back toward the null. The rotor is always driven toward the correct null and away from the other since direction of rotation changes as either null is crossed. The position of the resolver rotor is transferred to a panel-mounted indicator by a transmitting synchro in the 51Y-4/4A and a receiving synchro in the ADF bearing indicator.

(2) LOOP Mode.

The 51Y-4/4A receives signals only from the loop antenna in LOOP mode (refer to figure 10). The sense antenna is then disconnected from the circuit. The loop signal from the resolver rotor bypasses the balanced modulator since 110-Hz modulation is not desired. The rf, mixer, if., and audio stages function as a standard low-frequency receiver.

The reference winding of the loop motor is energized by the amplified output from the 110-Hz oscillator. The same 110-Hz signal is applied to one position of a normally open switch (LOOP L-R switch) in the 614L-8 ADF Control Unit. Another position of the switch receives a 110-Hz signal of the same amplitude but of a phase spring 180 degrees from the other. The switch rotor is connected to the control winding of the motor after a 90-degree phase shift (and amplification). The control winding of the loop motor is energized by rotating the spring-loaded switch either to the left or right. A signal is then applied to the control winding of the motor which either leads or lags the reference winding voltage 90 degrees, depending on the switch position connected. The motor and the resolver rotor, to which the motor is connected, rotate clockwise or counterclockwise, according to the switch position.

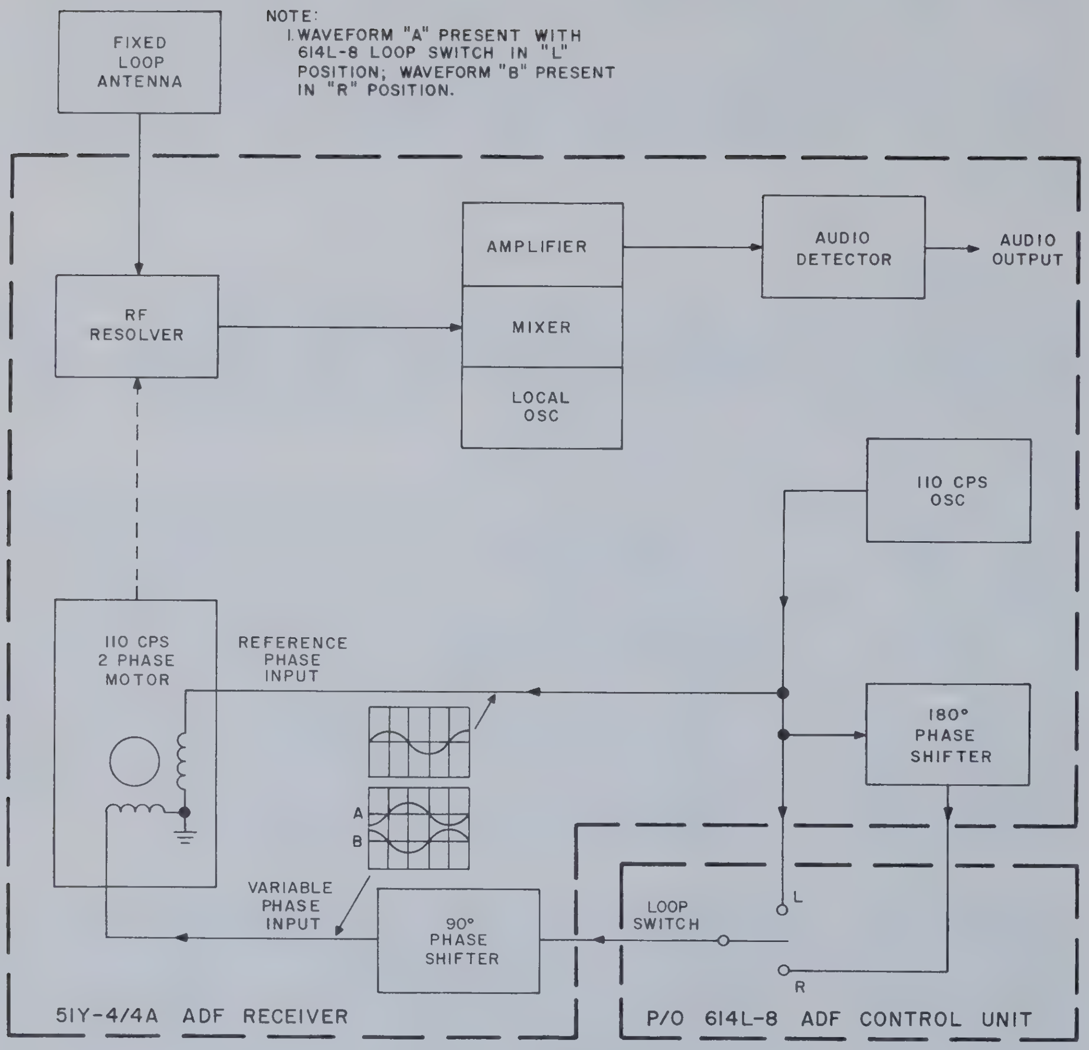
The operator can determine the direction to the station by either listening for a reduction in the aural output or by watching the tuning meter. This reduction indicates that the null in the loop receiving pattern has been rotated to the direction of the station. There are two nulls spaced 180 degrees apart in the loop pattern so 180-degree ambiguity of the station direction exists. At the null, the station is either in the direction indicated by the head of the ADF pointer or 180 degrees from this direction. The loop pattern can also be rotated by the LOOP L-R switch with 51Y-4/4A in the ADF mode.

(3) ANT Mode.

In ANT mode, the 51Y-4/4A accepts signals only from the sense antenna (refer to figure 11). The loop antenna is disconnected from the circuitry. The 51Y-4/4A operates as a low-frequency and broadcast-band receiver in ANT mode. Signals from all directions are received equally well. The 110-Hz oscillator and loop motor do not operate when the 51Y-4/4A is in ANT mode.

D. Detailed Theory of Operation.

The 51Y-4/4A schematics are shown in figures 813 and 814, and can be used as an overall reference to supplement the information provided in the following paragraphs.


FIXED LOOP ANTENNA
RF RESOLVER
AMPLIFIER
MIXER
LOCAL OSC
AUDIO DETECTOR
AUDIO OUTPUT
110 CPS OSC
110 CPS 2 PHASE MOTOR
REFERENCE PHASE INPUT
180° PHASE SHIFTER
A
B
VARIABLE PHASE INPUT
90° PHASE SHIFTER
LOOP SWITCH
L
R
51Y-4/4A ADF RECEIVER
P/O 614L-8 ADF CONTROL UNIT

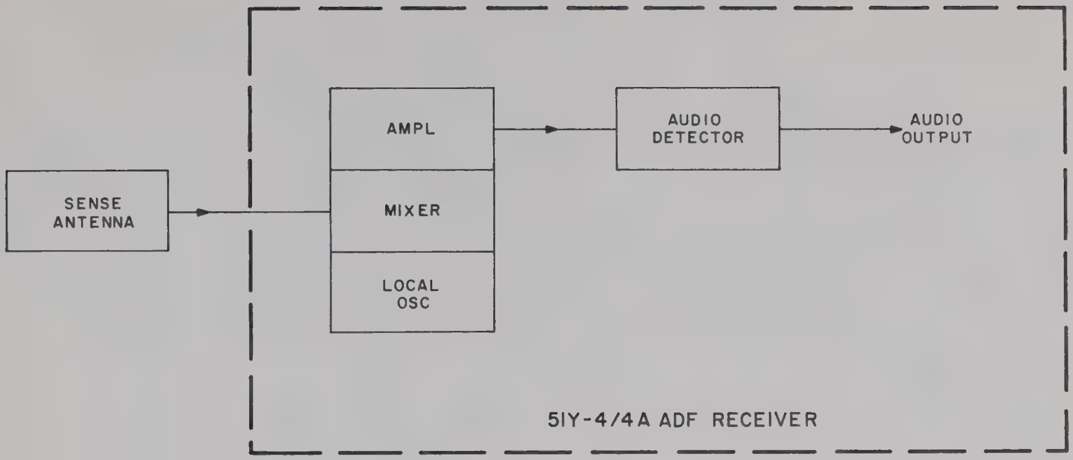
NOTE:
1. WAVEFORM "A" PRESENT WITH 614L-8 LOOP SWITCH IN "L" POSITION; WAVEFORM "B" PRESENT IN "R" POSITION.

Loop Mode, Functional Block Diagram
Figure 10

(1) Loop Input, First Loop Amplifier, Phase-Shift Network, Second Loop Amplifier, and Balanced Modulator.

(a) Loop Input and First Loop Amplifier.

The rf field within the resolver, which is generated by the resolver stators, induces a current into the resolver rotor. The output from the resolver rotor is applied to the grounded center-tap primary of transformer T1, T2, or T3. The transformer is selected by band/mode-switch wafer S1F. Transformer T1 is selected for band 1 frequencies (0.19 to 0.40 MHz), T2 for band 2 frequencies (0.40 to 0.84 MHz), and T3 for band 3 frequencies (0.84 to 1.75 MHz). The



Antenna Mode, Functional Block Diagram
Figure 11

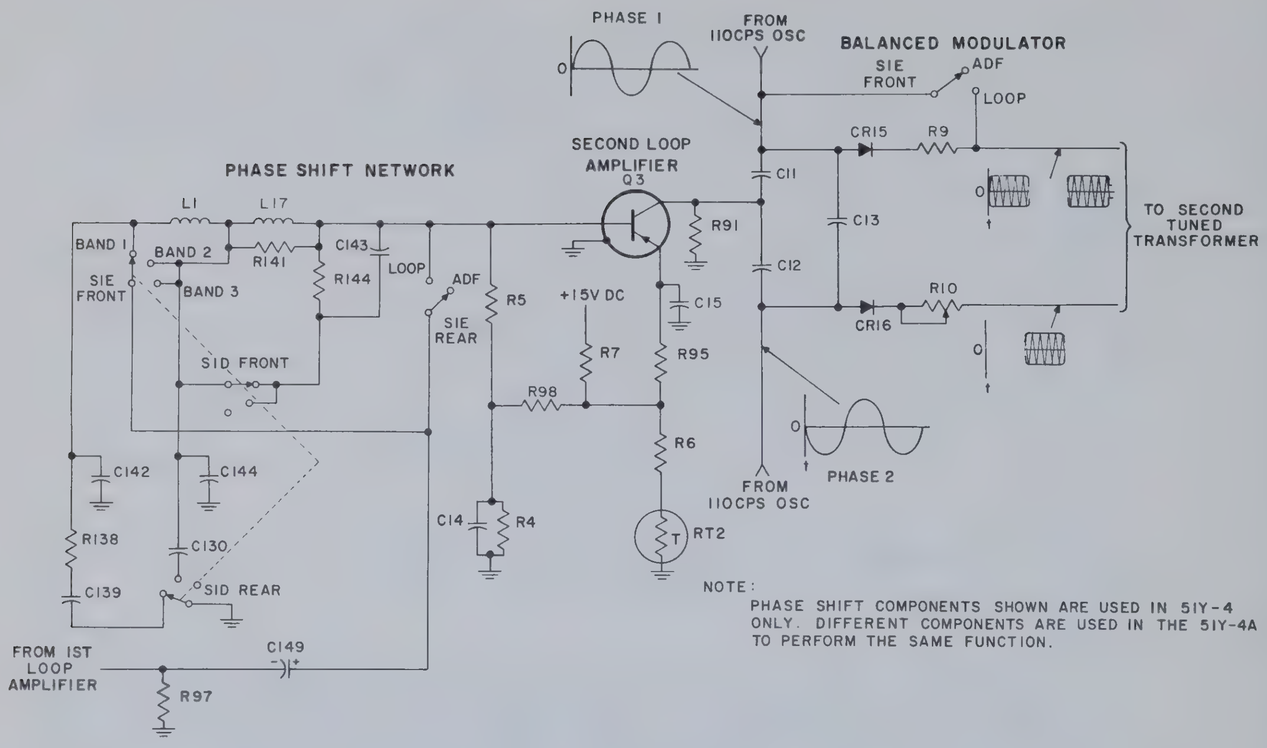
variable transformer secondary is tuned by the C1B section of tuning servo-controlled tuning capacitor C1. The tuning capacitor rotates through its entire area of travel for each band. Trimmer capacitors C2, C3, and C4 provide adjustment of the resonant frequency of each transformer secondary to assure proper tracking of each band. The unused secondaries are disabled by the front side of band/mode switch wafer S1G. The rear side of wafer S1G connects the transformer being used to first loop amplifier Q1. Resistors R1 and R2 provide base bias for Q1 through the input transformer secondary.

(b) Phase-Shift Network and Second Loop Amplifier.

A primary difference between the 51Y-4 and 51Y-4A is in the phase-shift network and second loop amplifier circuits. Because of these circuit differences, phase-shift network and second loop amplifier circuit theory are separated into two paragraphs.

1. 51Y-4 (refer to figure 12.)

After amplification in first loop amplifier Q1, loop rf voltage is developed across R97 and applied through C149 to a phase-shift network in ADF mode by switch wafer S1E front or to the base of second loop amplifier Q3 in LOOP mode by switch wafer S1E rear. In ANT mode, supply voltage is removed from loop amplifiers Q1 and Q3 so the loop signal is not passed. During LOOP mode of operation, the loop rf bypasses the phase-shift network through switch wafer S1E rear. The loop rf signal is amplified by second loop amplifier Q3. Base bias for Q3 is provided by resistors R4 and R98, and gain is temperature stabilized by thermistor RT2. The loop signal then bypasses diode CR15 through switch wafer S1E front to avoid attenuation. The loop rf signal energizes the primary of transformer T4, T5, or T6.


PHASE I
FROM
110CPS OSC
BALANCED MODULATOR
SIE
FRONT
ADF
LOOP
SECOND LOOP
AMPLIFIER
Q3
CR15
R9
C11
PHASE SHIFT NETWORK
L1
L17
BAND 1
BAND 2
R141
C143
LOOP
R91
C13
TO SECOND
TUNED
TRANSFORMER
SIE
FRONT
BAND 3
R144
ADF
R5
+15V DC
C12
C15
R10
SIE
REAR
CR16
SID FRONT
R7
R95
R98
R6
C142
C144
PHASE 2
FROM
110CPS OSC
C14
R4
R138
C130
RT2
T
C139
SID REAR
FROM 1ST
LOOP
AMPLIFIER
C149
R97
0

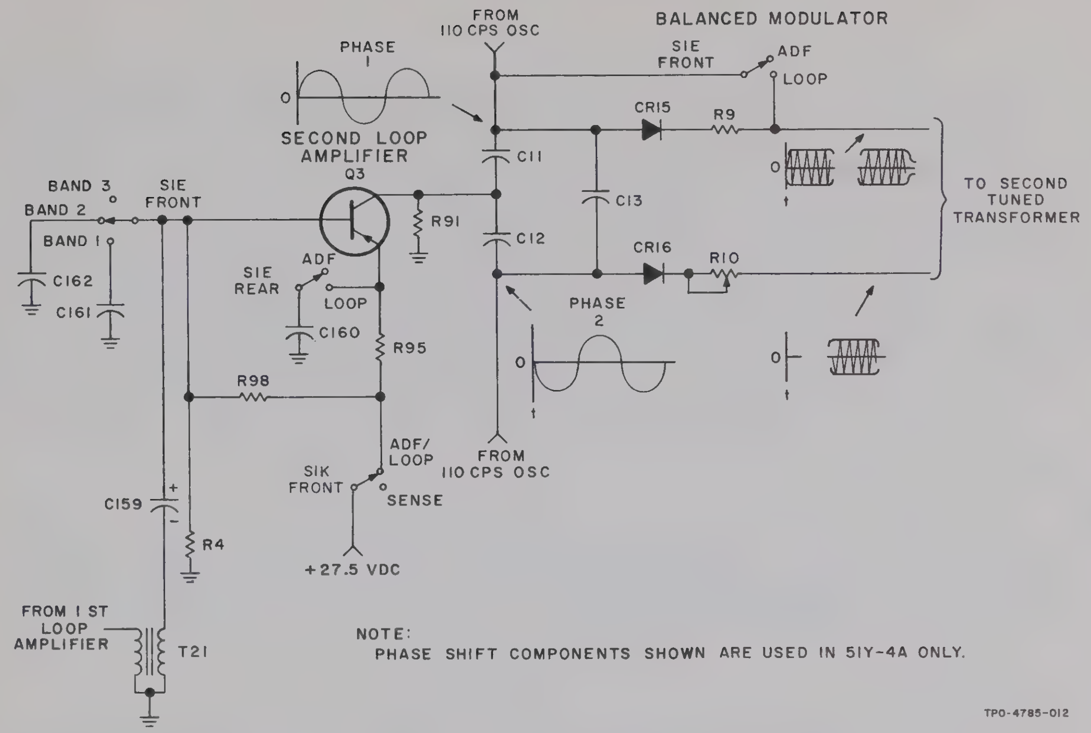
NOTE:
PHASE SHIFT COMPONENTS SHOWN ARE USED IN 51Y-4 ONLY. DIFFERENT COMPONENTS ARE USED IN THE 51Y-4A TO PERFORM THE SAME FUNCTION.

Phase Shift Network, Second Loop Amplifier and Balanced Modulator
of 51Y-4, Simplified Schematic Diagram
Figure 12

In ADF mode, the phase of the loop signal is lagged 90 degrees by a combination of inductors L1, L17, and other circuit impedances. The change of impedance is necessary to provide the 90-degree phase shift at the frequencies of each of the three bands. The loop signal is then either in phase or 180 degrees out of phase with the sense antenna rf signal. Capacitor C14 provides an ac bypass for resistor R4 to prevent feedback through the power supply line.

2. 51Y-4A. (Refer to figure 12A.)

After amplification in first loop amplifier Q1, loop rf voltage is developed across transformer T21 and applied through C159 to the base of second loop amplifier Q3. The combined phase shift of T21 and C159 is used to effect 90 degrees phase lag for ADF mode of operation. In ANT mode, supply voltage is removed from loop amplifiers Q1 and Q3 so the loop signal is not passed. During LOOP mode of operation, signal is phase shifted ahead by 90 degrees when S1E rear switches C160 in parallel with Q3 emitter circuit. The loop rf signal is amplified by second loop amplifier Q3. Base bias for Q3 is provided by resistors R4 and R98. The loop rf signal then bypasses CR15 and resistor R9 through switch wafer S1E front to avoid attenuation. The loop rf signal energizes the primary of transformer T104, T105, or T106 depending upon which band is selected.


FROM
110 CPS OSC
BALANCED MODULATOR
PHASE
1
S1E
FRONT
ADF
LOOP
0
CR15
R9
SECOND LOOP
AMPLIFIER
Q3
C11
0
t
TO SECOND
TUNED
TRANSFORMER
BAND 3
S1E
FRONT
BAND 2
R91
C13
BAND 1
C12
C162
S1E
REAR
ADF
CR16
R10
C161
LOOP
PHASE
2
C160
R95
0
0
R98
t
t
ADF/
LOOP
FROM
110 CPS OSC
S1K
FRONT
SENSE
C159
+
-
R4
+27.5 VDC
FROM 1 ST
LOOP
AMPLIFIER
T21
NOTE:
PHASE SHIFT COMPONENTS SHOWN ARE USED IN 51Y-4A ONLY.
TPO-4785-012

Phase Shift Network, Second Loop Amplifier, and Balanced Modulator
of 51Y-4A, Simplified Schematic Diagram
Figure 12A

In ADF mode, the phase of the loop signal is lagged 90 degrees by the combined phase shifts of T21, C159, and C161 or C162. The change of impedance provided by S1E front switching is necessary to provide the 90-degree phase shift at the frequencies of each of the three bands. The loop signal is then either in phase with or 180 degrees out of phase with the sense antenna signal.

(c) Balanced Modulator.

The signal is amplified in loop amplifier Q3 and applied to the anodes of CR15 and CR16. Signals from the 110-Hz oscillator are also applied to the anodes of CR15 and CR16 through switch wafer S1D. The phase of the 110-Hz voltage at the anode of CR15 is 180 degrees out of phase with the 110-Hz voltage at the anode of CR16. The cathodes of CR15 and CR16 are connected to opposite ends of the grounded center-tap primary of transformer T4, T5, or T6 (T104, T105, or T106 in the 51Y-4A). Diode CR15 is forward biased during the positive half-cycle of the applied 110-Hz signal and reverse biased during the second half. Diode CR16 is also forward biased during one-half of each cycle and reverse biased during the other half. Since the 110-Hz voltage at the diode anodes is 180 degrees out of phase, CR15 conducts during the half-cycle that CR16 is cut off and CR16 conducts during the half-cycle that

CR15 is cut off. Because of this 110-Hz switching action, the loop rf carrier signal is applied to the top end of the transformer primary during half the 110-Hz cycle and to the bottom end during the other half. The carrier signal in the top end of the primary is equal in magnitude to the signal in the lower half of the transformer and is 180 degrees out of phase with the signal in the lower end of the primary. Therefore, the carrier will cancel, and the signal on the secondary will be a double-sideband suppressed-carrier signal. The sense signal is applied to a third winding in transformer T4, T5, or T6 (T104, T105, or T106 in 51Y-4A). In ADF mode, the loop and sense rf signals combine to form an amplitude-modulated signal with a modulation frequency of 110 Hz. Depth of modulation is determined by the angular difference between resolver rotor position and its null, and by the phase of the modulation envelope determined by the direction from null of the resolver rotor.

(2) Sense Input.

Another significant difference between the 51Y-4 and 51Y-4A is in the sense input circuit. Because of these circuit differences, sense input circuit theory is separated into two paragraphs.

(a) 51Y-4.

In LOOP mode, the sense antenna is disconnected from the transformer winding and grounded by switch wafer S1A front. (Refer to the schematic diagram, figure 812.) An impedance equal to the sense system impedance is connected in place of the sense antenna to prevent detuning of the secondary resonant circuit. During ANT mode or ADF mode of operation, the sense antenna is connected to the sense winding of the transformer through switch wafers S1A rear and S1C rear. The sense winding of T4, T5, or T6 is tuned by section A of tuning servo-controlled tuning capacitor C1. The sense windings of the transformers which are not in use are grounded by switch wafer S1C front.

(b) 51Y-4A.

The sense antenna can be connected either to pin A or pin F of the 51Y-4A sense antenna connector depending on the capacitance of the sense antenna and cable. (Refer to the schematic diagram, figure 813.) A sense antenna and cable of 270 pf capacitance is connected to pin A which is switched to a tap on the sense winding of transformer T104, T105, or T106 in ANT or ADF mode. Pin A is switched to the sense winding of the proper transformer through switch wafers S1R rear and S1C rear. A sense antenna and cable of 150-pf capacitance is connected to pin F which is switched to a second, higher impedance tap on transformer T104, T105, and T106 in ANT or ADF mode. Pin F is switched to the sense winding of the proper transformer through switch wafers S1R front and S1O rear. The sense winding of T104, T105, or T106 is tuned by section A of tuning capacitor C1. The sense windings of the transformers which are not in use are grounded by switch wafer S1C front. In LOOP mode, the sense antenna is disconnected from the transformer winding and grounded by switch wafer S1N front. A 270-pf capacitor is then connected to the sense winding in place of the sense antenna and cable by switch wafer S1R rear to prevent detuning of the tuned sense input circuit.

(3) RF Amplifier.

The balanced push-pull output winding of transformer T4, T5, or T6, (T104, T105, or T106 in the 51Y-4A) is connected to push-pull rf amplifier Q2 and Q4 through switch wafers S1C rear and S1N (S1N rear in 51Y-4A). A dc voltage from the rf gain potentiometer in the 614L-8 controls the base emitter bias (and gain) of Q2 and Q4 in ANT and LOOP modes by controlling the dc voltage on the emitters. In ADF mode, bias is fixed and rf gain cannot be varied. Gain of the 51Y-4 is then controlled at the audio stage. A dc voltage from the agc amplifier also affects the bias through the emitter voltage. Potentiometer R136 allows balancing of current flow through the two transistors.

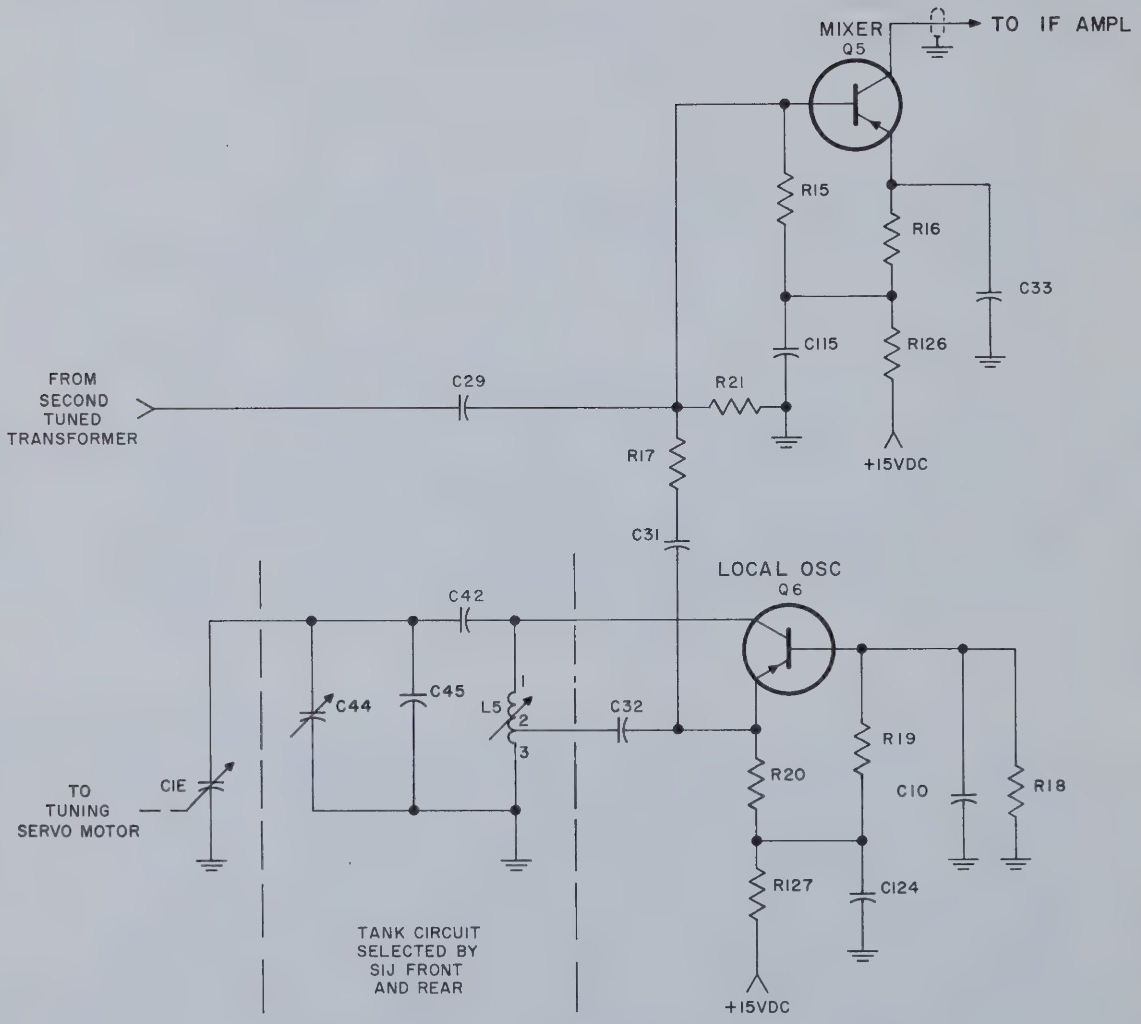
The push-pull output of the rf amplifier is developed across the grounded center-tap primary of transformer T7, T8, or T9 (T107, T108, or T109 in the 51Y-4A). Switch wafer S1P rear applies the push-pull output to the primary of the transformer in use and also connects section D of tuning capacitor C1 to the proper transformer secondary. Switch wafer S1P front grounds the two transformer secondaries which are not in use. The variable inductance secondary of transformer T7, T8, or T9 (T107, T108, or T109 in 51Y-4A) is tuned by tuning capacitor C1D. A portion of the voltage of the secondaries of T7, T8, or T9 (T107, T108, or T109) is developed across C152, L8 or C96 respectively. This voltage also is developed across the resonant primary circuit of transformer T10, T11, or T12. The variable inductance primaries of transformers T10, T11, and T12 are tuned by section C of tuning capacitor C1 which is connected to the transformer in use through switch wafer S1I front. The unused primaries of T10, T11, and T12 are grounded by switch wafer S1I rear. The two sets of transformers provide high selectivity for improved rejection of spurious responses. The output from the secondary of T10, T11, or T12 is applied to the base of mixer Q5 through switch wafer S1I front and capacitor C29.

(4) Local Oscillator.

The signal from the local oscillator also is coupled to the base of the mixer (refer to figure 13). The local oscillator frequency is determined by section E tuning capacitor C1. The local oscillator frequency is always 142.5 kHz higher than the frequency of the carrier being received. The resonant collector circuit, which changes for each band, is selected by switch wafer S1J front. Each tuned circuit has a variable trimmer capacitor for separate frequency adjustment on each band. Feedback is applied from the collector through the resonant circuit to the emitter. Since the base is at ac ground, changing the emitter voltage changes the base-emitter bias. This feedback to the emitter is of the proper phase to have the same effect as positive feedback to the base. Oscillation occurs at the resonant frequency of the tuned circuit. The oscillator voltage is applied from the emitter through coupling capacitor C31 and isolation resistor R17 to the base of mixer Q5.

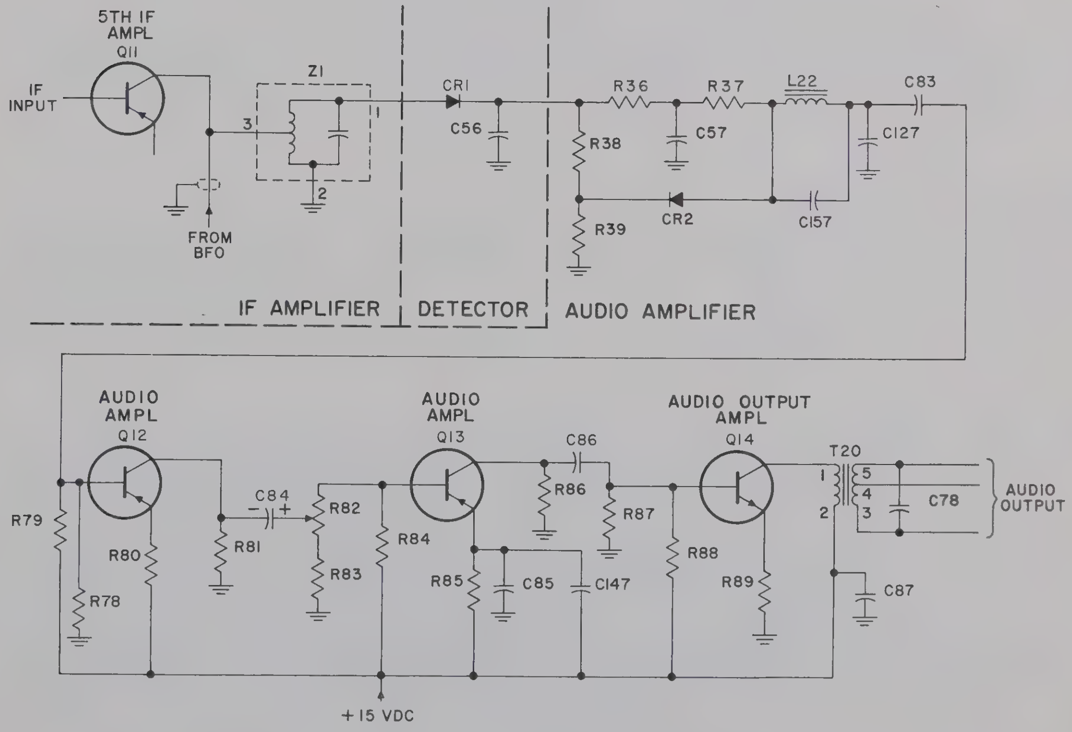
(5) Mixer/IF. Amplifiers.

The collector of Q5 is tapped to a coil which is part of a resonant circuit in T13. The tap is at the proper point on the coil to provide the correct load impedance for Q5. The signal developed in the first resonant circuit of T13 is inductance and capacitance coupled to the second resonant circuit. The coil of the second resonant circuit is tapped to provide the correct output impedance. All if. transformers


MIXER
Q5
TO IF AMPL
R15
R16
C33
C115
R126
FROM
SECOND
TUNED
TRANSFORMER
C29
R21
+15VDC
R17
C31
LOCAL OSC
Q6
C42
C44
C45
L5
1
2
3
C32
R19
R20
C10
R18
TO
TUNING
SERVO MOTOR
C1E
R127
C124
TANK CIRCUIT
SELECTED BY
S1J FRONT
AND REAR
+15VDC

Local Oscillator and Mixer, Simplified Schematic Diagram
Figure 13

have a resonant frequency and bandwidth which passes the 142.5 kHz if. and sidebands. The signal is applied to the base of the 1st if. amplifier Q7 through potentiometer R90 which provides if. gain adjustment. The agc amplifier affects the base bias and thus the gain of Q7 through R24. The bias of Q7 also may be controlled by the GAIN control knob of the 614L-8 ADF Control Unit in LOOP and ANT modes. The if. is amplified in Q7 and applied to the first tuned circuit of T14. The signal is inductance and capacitance coupled to the second-tuned circuit of T14 where it is tapped to the base of the 2nd if. amplifier Q8. The base bias of Q8 is controlled by the agc amplifier in all modes and by the 614L-8 GAIN control in LOOP and ANT modes. The collector of Q8 is loaded by the inductance of the first-tuned circuit of T15. The signal is inductance and capacitance coupled to the second-tuned circuit of T15, then to the base of the 3rd if. amplifier Q9. The gain of Q9 is temperature stabilized by thermistor RT5. Amplified if. signal from Q9 passes the two-tuned circuits of T16 and is amplified by the 4th if. amplifier Q10. The output of Q10 is coupled through two-tuned circuits of T17. The signal from T17 is applied to the base of the 5th if. amplifier Q11, to the 110-Hz detector, and to the tuning meter rectifier. The if. amplifier, Q11, is loaded by the inductor of tuned circuit Z1 (refer to figure 14). The beat-frequency oscillator (BFO) output, when present, is mixed with the if. signal at the collector of Q11. The voltage across Z1 is detected and applied to the base of audio amplifier Q12.


5TH IF
AMPL
Q11
IF
INPUT
Z1
3
1
2
FROM
BFO
CR1
C56
R36
R37
L22
C83
R38
C57
C127
CR2
C157
R39
IF AMPLIFIER
DETECTOR
AUDIO AMPLIFIER
AUDIO
AMPL
Q12
AUDIO
AMPL
Q13
AUDIO OUTPUT
AMPL
Q14
T20
C84
C86
R79
R80
R78
R81
R82
R83
R84
R85
C85
C147
R86
R87
R88
R89
1
2
5
4
3
C78
C87
AUDIO
OUTPUT
+15 VDC

Audio Detector and Audio Amplifier, Simplified Schematic Diagram
Figure 14

(6) Detectors.

The output of the 4th if. stage is detected by diode CR3, and applied to the input of the agc amplifier and loop servo amplifier. Meter rectifier diode CR10, resistor R40, and capacitor C117 provide the 614L-8 tuning meter with a dc voltage which is proportional to the if. amplitude.

Audio amplifier detector diode CR1 allows positive half-cycles of the audio-modulated if. to pass (refer to figure 14). The if. is bypassed to ground by capacitor C56 and the audio derived from the if. modulating envelope passes limiter diode CR2. Since the negative half-cycles are eliminated by CR1, when audio peaks occur, the anode of CR2 becomes positive. The cathode of CR2 also becomes positive on audio peaks because of voltage divider R38 and R39 but not as positive as the anode. The voltage differential across CR2 increases as the audio voltage increases. Diode CR2 conducts more at audio peaks and therefore limits the audio. The detected and limited audio is applied to the base of the audio amplifier Q12.

(7) Audio Amplifier

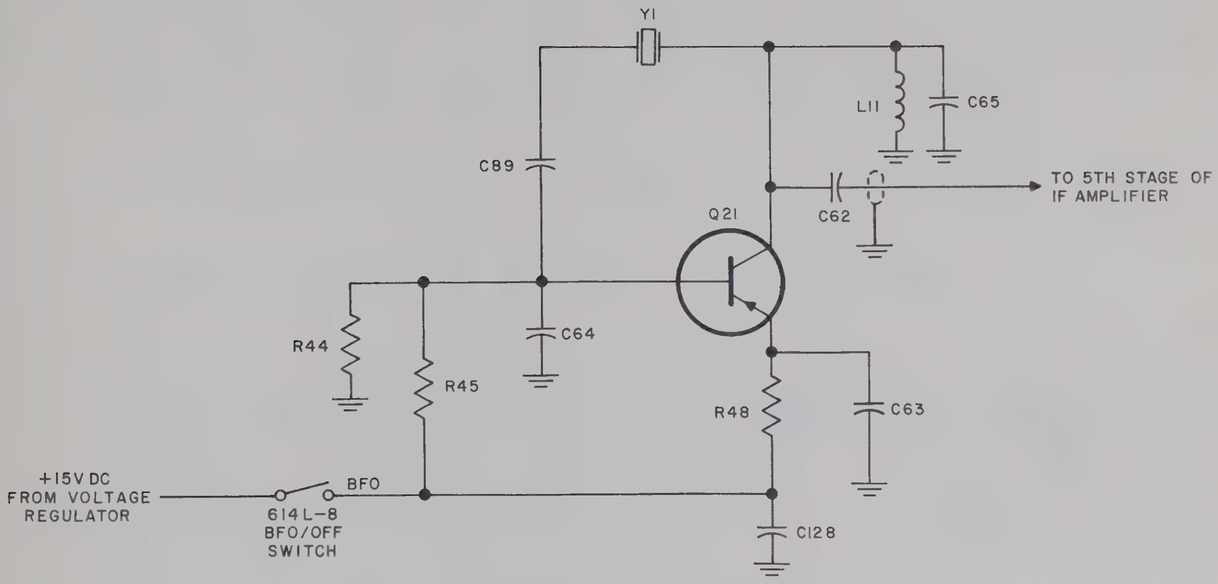
The audio from the audio detector is applied to the base of audio amplifier Q12 through C83 (refer to figure 14). Base-to-emitter bias of Q12 is provided by resistors R78 and R79. The amplified output from Q12 is applied to the base of audio amplifier Q13 through audio output adjustment potentiometer R82. The audio is amplified in Q13, and is applied to the base of the audio output amplifier Q14. The primary of audio transformer T20 is the collector load for Q14. The center-tapped transformer secondary provides the audio signal at an impedance of 600 ohms for the external audio system.

(8) BFO Oscillator.

An ac voltage with a frequency of 142.5 kHz is provided by the bfo when the 614L-8 BFO switch is closed. The BFO switch applies +15 volts dc to the bfo transistor, Q21 (refer to figure 15). The circuit is an electron-coupled, crystal-controlled oscillator. The frequency of the oscillator is fixed at 142.5 kHz by crystal Y1.

(9) AGC Amplifier.

Audio frequencies superimposed on a positive dc voltage are applied to the base of Q16 from CR3. The base bias of Q16 is provided by voltage divider R41 and R42 through CR3. The total dc level at the base increases as the if. level increases because of increased dc from the detector. The dc level at the collector of Q16 is applied directly to the base of agc amplifier Q15, but the audio voltage is eliminated by C60. The gain of Q15 is temperature stabilized by thermistor RT3. As increasing if. raises the base-to-emitter forward bias of Q16, the current through Q16 increases, and the positive dc voltage on the base of Q15 decreases. This reduces the base-to-emitter forward bias and the current through Q15. The base bias on agc-controlled stages is provided by a voltage divider for each stage between a positive voltage and ground through Q15 and R46. As the if. amplitude increases and the positive current flowing from the bases of the agc-controlled transistors to ground is cut off by Q15, the transistor bases become more positive.



Beat-Frequency Oscillator, Simplified Schematic Diagram
Figure 15

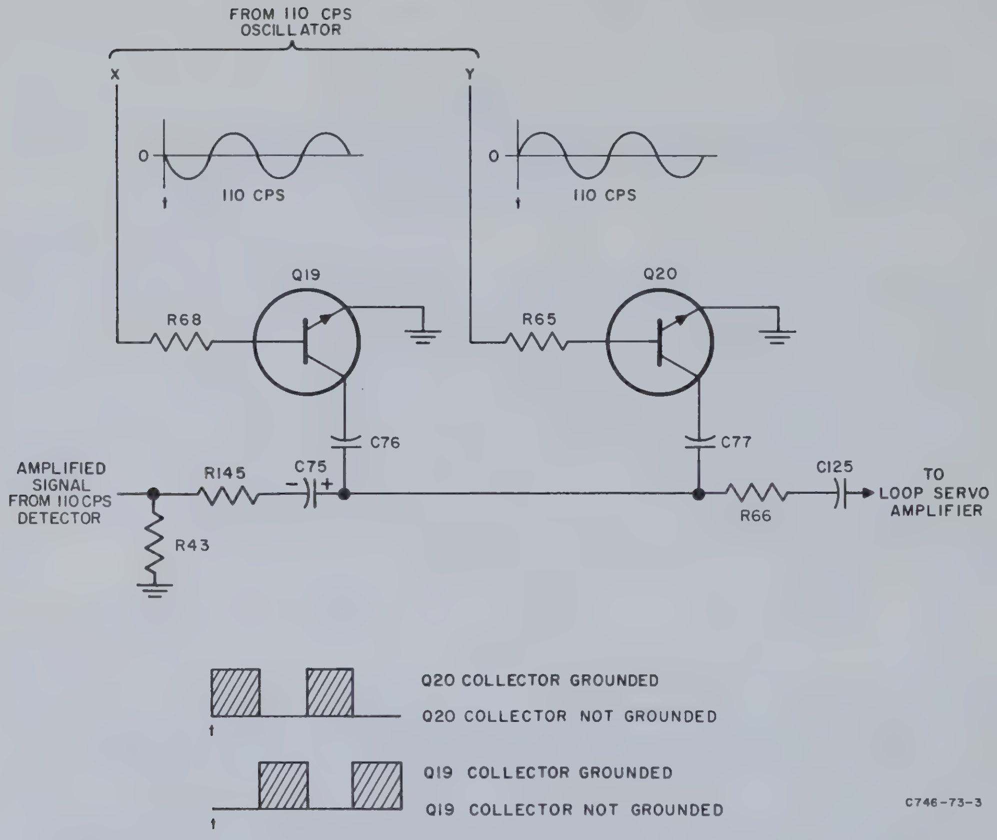
This reduces the base-to-emitter forward bias on the agc-controlled stages and reduces the gain. Thus, the variation in if. and audio voltages resulting from rf input variation is greatly reduced.

When +27.5 volts dc is applied to band/mode switch motor B2, a portion of this voltage is applied through diode CR5 and resistor R116 to the base of amplifier Q16. This positive dc voltage saturates Q16 and changes the agc voltage. Gain is reduced in the stages controlled by agc. Noise produced when the band/mode switch motor runs is cut off.

(10) Synchronous Filter.

The synchronous filter, Q19 and Q20, has a response curve which is much like that of an LC filter tuned to 110 Hz. That is, maximum signal transfer occurs at 110 Hz, with response falling off on either side (refer to figure 16).

Transistors Q19 and Q20 are switches controlled by a 110-Hz signal from the 110-Hz oscillator. The signal from the 110-Hz oscillator is applied to the bases of Q19 and Q20. The signal applied to the base of Q19 is 180 degrees out of phase with the signal applied to the base of Q20. This results in one transistor conducting while the other is turned off.


FROM 110 CPS OSCILLATOR
X
Y
0
110 CPS
t
0
110 CPS
t
Q19
Q20
R68
R65
C76
C77
AMPLIFIED SIGNAL FROM 110 CPS DETECTOR
R145
C75
−
+
C125
TO LOOP SERVO AMPLIFIER
R66
R43
Q20 COLLECTOR GROUNDED
Q20 COLLECTOR NOT GROUNDED
t
Q19 COLLECTOR GROUNDED
Q19 COLLECTOR NOT GROUNDED
t
C746-73-3

Synchronous Filter Operation
Figure 16

The input signal from the 110-Hz detector will be in phase with one of the base signals and 180 degrees out of phase with the other, depending on the position of the loop antenna. For explanation purposes, assume the 110-Hz signal from the detector is in phase with the 110-Hz signal at the base of Q20 and thus 180 degrees out of phase with the signal at the base of Q19. During the first half-cycle the positive signal from the 110-Hz detector is applied to the collectors of Q19 and Q20. At the same time the signal applied to the base of Q20 by the 110-Hz oscillator is positive, causing Q20 to conduct. Current will flow through Q20, causing the transistor side of C77 to acquire a negative charge. During the next half-cycle the input signal from the detector is negative. This negative signal is applied to the collectors of Q19 and Q20. At the same time the voltage at the base of Q20 will be negative and the voltage at the base of Q19 will be positive. Q20 will then be cut off while Q19 is conducting. When Q20 is cut off the charge across C77 will remain.

The negative voltage on the collector of Q19 will cause the emitter (ground) of Q19 to appear positive. Current will flow through C76, causing the transistor side of C76 to acquire a positive charge. This charge will remain across C76 when Q19 is not conducting.

This switching process occurs at a 110-Hz rate. Any signals other than 110 Hz which are applied to the filter will be averaged out to zero by C76 and C77.

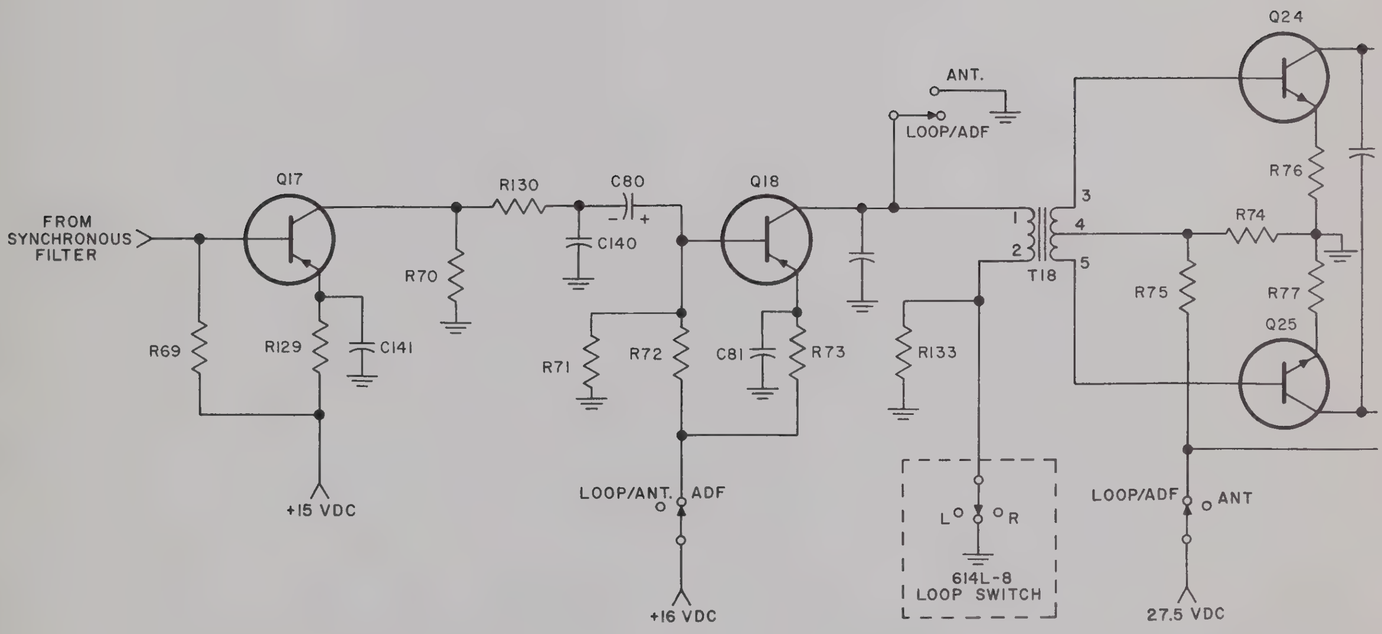
(11) Loop Servo Amplifier.

The 110-Hz signal which passes the synchronous filter is amplified in loop servo amplifier Q17 (refer to figure 17). The collector of loop amplifier Q18 is connected through the primary of the loop servo-amplifier push-pull driver transformer to ground by the 614L-8 LOOP L-R switch. The 110-Hz signal which originated in the balanced modulator is phase shifted 90 degrees in the push-pull driver transformer and other loop servo-amplifier circuits. Push-pull loop servo amplifier Q24, Q25 energizes the control winding of the loop servo motor. The energizing voltage is a 110-Hz voltage which has been shifted 90 degrees in phase from the 110-Hz modulation originating in the balanced modulator.

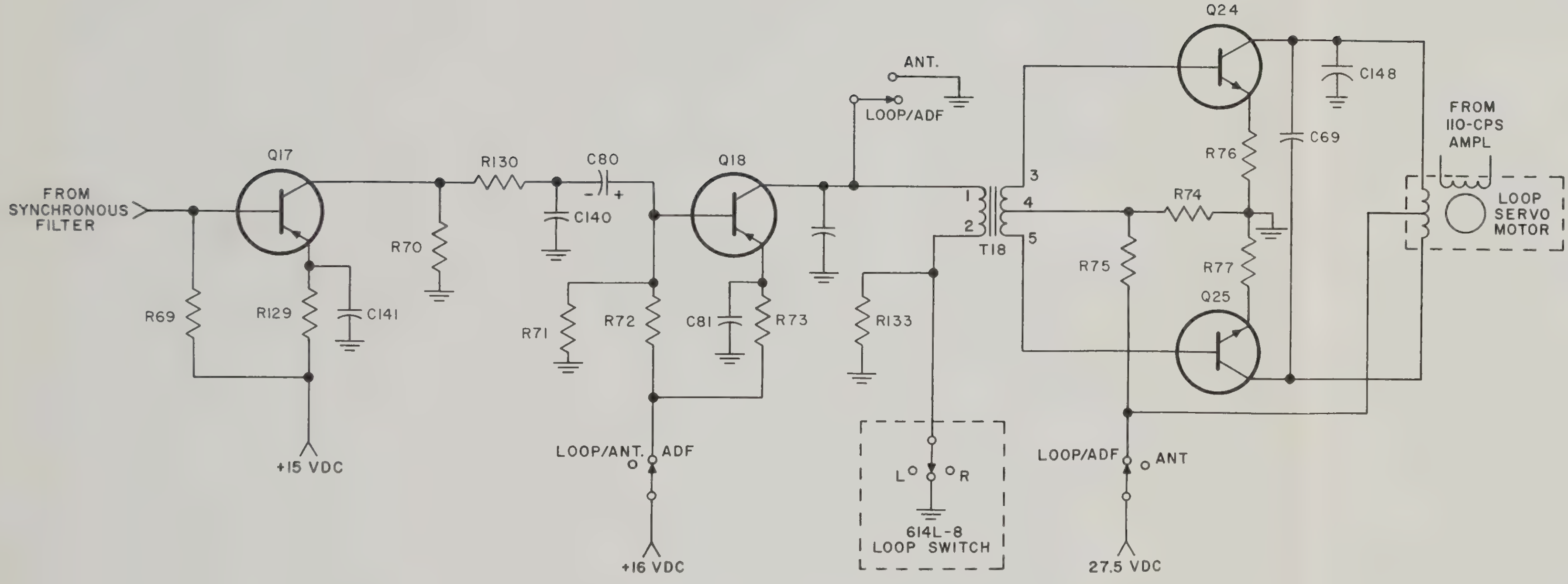
(12) Loop Servo Mofor.

An amplified 110-Hz signal is applied to the reference winding of the loop servo motor directly from the 110-Hz oscillator (refer to figure 17). The voltage in the control winding either leads or lags the reference phase voltage by 90 degrees. The 2-phase loop servo motor rotates in one direction if the variable phase voltage leads the reference phase voltage by 90 degrees and rotates in the other direction if the variable phase voltage lags the reference phase voltage by 90 degrees. The phase depends upon the phase of the loop signal input to the balanced modulator, and the loop signal changes phase 180 degrees as the resolver rotor pattern null shifts across the apparent rf source within the resolver. Therefore, the motor rotates in one direction if the apparent rf source is on one side of the rotor pattern null and rotates in the other direction if the source is on the other side of the null.

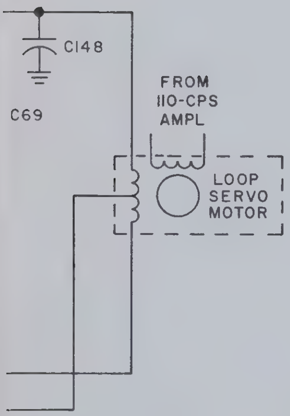
The loop servo motor is geared to the resolver rotor. Since there are two nulls in the figure-eight rotor pattern, the motor turns the rotor in one direction when the rotor axis is from 0 degree to 180 degrees from the signal source and in the other direction at any angle from 180 to 360 degrees from the signal source. The rotor then is turned so that one null is on the signal source and the second null (180 degrees from the first) is away from the source. As the true rotor null approaches the source direction, the loop signal amplitude decreases, and the loop signal modulation in the balanced modulator decreases. As a result, the amplitude of the voltage in the loop servo-motor control winding decreases (though the phase does not change). The motor slows down and stops when the loop signal disappears as the true null is reached. If the signal source should appear exactly within the


Q24
ANT.
LOOP/ADF
3
R76
Q17
R130
C80
Q18
1
4
R74
FROM
SYNCHRONOUS
FILTER
C140
2
T18
5
R70
R75
R77
Q25
R69
R129
C141
R71
R72
C81
R73
R133
+15 VDC
LOOP/ANT.
ADF
L
R
614L-8
LOOP SWITCH
LOOP/ADF
ANT
+16 VDC
27.5 VDC

Loop Servo Amplifier, Simplified Schematic Diagram
Figure 17


Q24
C148
ANT.
LOOP/ADF
FROM 110-CPS AMPL
C69
R76
3
4
5
1
2
T18
R74
LOOP SERVO MOTOR
FROM SYNCHRONOUS FILTER
Q17
R130
C80
Q18
C140
R70
R69
R129
C141
R71
R72
C81
R73
R133
R75
R77
Q25
+15 VDC
LOOP/ANT.
ADF
+16 VDC
L
R
614L-8 LOOP SWITCH
LOOP/ADF
ANT
27.5 VDC

Loop Servo Amplifier, Simplified Schematic Diagram
Figure 17


C148
C69
FROM
110-CPS
AMPL
LOOP
SERVO
MOTOR

null opposite the true null, the slight hunting of the rotor would cause an rf loop signal to appear, and the motor and rotor would begin the rotation toward the true null.

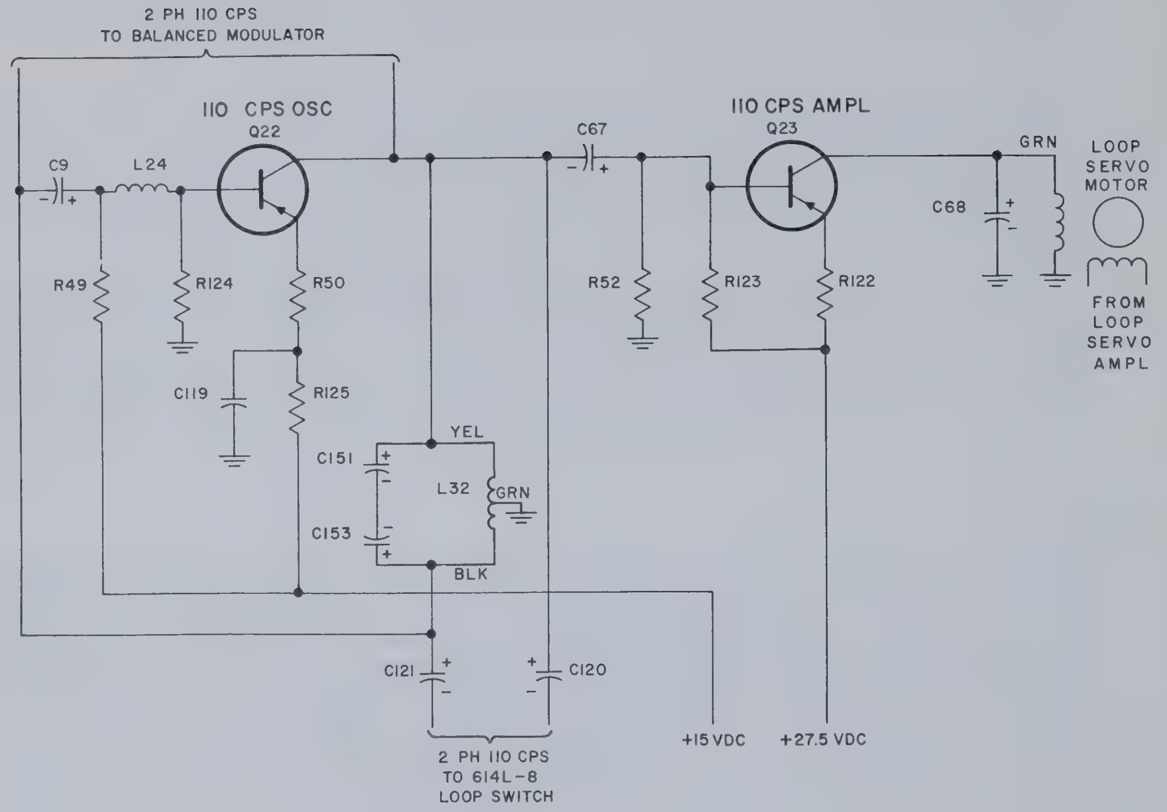
The primary of the loop servo-amplifier push-pull driver transformer T18 also may be energized from the normally grounded LOOP L-R switch end. This takes place when the 614L-8 LOOP L-R switch is rotated from the normally grounded position to any position which connects a 110-Hz signal to the transformer primary. A signal from the 110-Hz oscillator collector, or the oscillator signal shifted 180 degrees in phase, may be applied through the switch. The collector of loop servo amplifier Q18 has much higher load impedance when the loop switch is not in ground position. The amplification of Q18 drops, and the 110-Hz signal from the balanced modulator is greatly reduced. The ac signal from the LOOP L-R switch has low impedance to ground through Q18. The 110-Hz signal from the LOOP L-R switch overrides the balanced modulator signal and controls the motor.

(13) Indicator Synchro System.

The rotor of synchro transmitter B4 is geared one-to-one to the rotor of resolver B3. The synchro transmitter rotor is energized by the aircraft 400-Hz power source. Currents are induced into the three stators of the synchro transmitter and transferred to the stator windings of the synchro receiver in the bearing indicator. A magnetic field identical to the field in the synchro transmitter is generated in the receiver by the stator windings. The receiver rotor winding also is energized by the aircraft 400-Hz supply, and the magnetic field produced by the receiver rotor locks in with the field produced by the receiver stators. The synchro receiver rotor winding is connected directly to the ADF pointer of the indicator dial. The position of the resolver rotor of the 51Y-4/4A is thus transferred to the ADF indicator. The indicator may be a simple one-needle, fixed-card bearing indicator which gives the relative bearing to the station or an RMI type which combines magnetic heading with the ADF indication.

(14) 110-Hz Oscillator and Manual Loop Control.

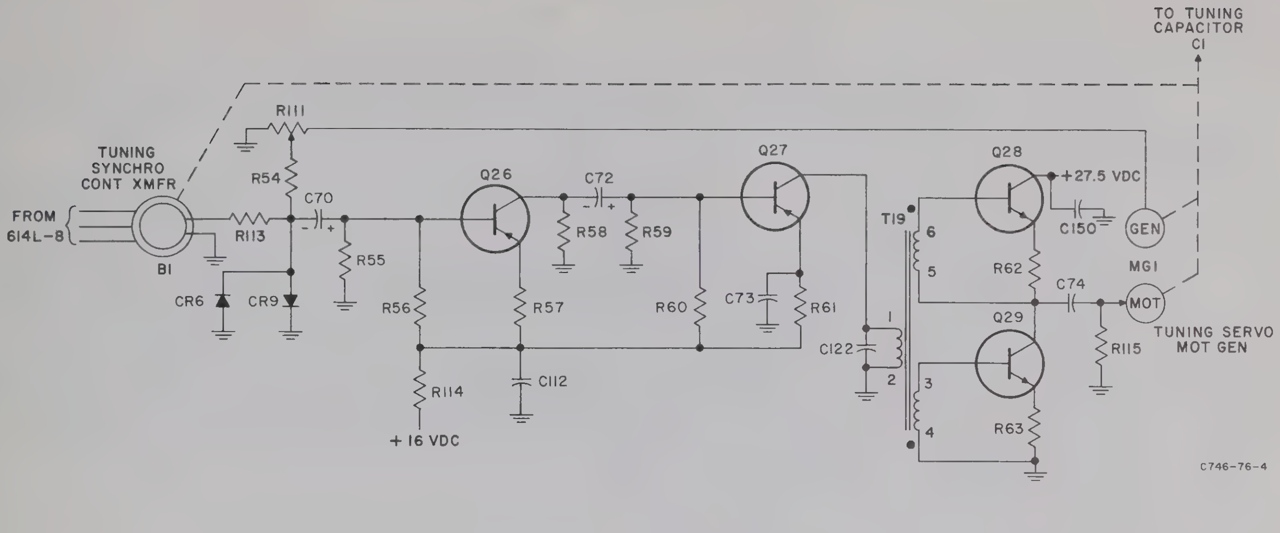
The 110-Hz oscillator is a modified Hartley oscillator (refer to figure 18). The collector of Q22 is coupled back to the base of Q22 through the impedance of L32, C151, and C153. A center tap on the inductor is grounded, providing a 180-degree phase shift at the inductor-capacitor junction opposite the input at the resonant frequency of 110 Hz. The 110-Hz voltage at the base is of sufficient amplitude and of proper phase to cause oscillation. The 110-Hz oscillator operates only in ADF and LOOP modes. The collector of Q22 is connected to one position of the 614L-8 LOOP L-R switch. The output of the impedance network (L32, C151, and C153), which is 180 degrees out of phase with the collector of Q22, is connected to another position of the LOOP L-R switch. The loop servo amplifier then may be rotated in either direction by connecting the LOOP L-R switch rotor to the 0-degree phase or 180-degree phase position. The collector of Q22 also is coupled to the base of the 110-Hz amplifier Q23. The amplified 110-Hz oscillator voltage energizes the reference phase winding of the loop servo motor. The dc supply voltage is applied to the 110-Hz amplifier in ADF and LOOP modes only.


2 PH 110 CPS
TO BALANCED MODULATOR
110 CPS OSC
Q22
C9
L24
R49
R124
R50
R125
C119
C151
C153
L32
YEL
GRN
BLK
C121
C120
C67
110 CPS AMPL
Q23
R52
R123
R122
C68
GRN
LOOP
SERVO
MOTOR
FROM
LOOP
SERVO
AMPL
+15 VDC
+27.5 VDC
2 PH 110 CPS
TO 614L-8
LOOP SWITCH

110-Hz Oscillator, Simplified Schematic Diagram
Figure 18

(15) Tuning System.

The 51Y-4/4A is tuned within each band by tuning servo-controlled tuning capacitor C1. Tuning capacitor C1 is positioned by a synchro control transformer in the 51Y-4/4A to which C1 is mechanically connected (refer to figure 19). The synchro control transformer is controlled by a synchro transmitter in the 614L-8 ADF control unit. The stators of the tuning synchro transmitter in the 614L-8 transfer the magnetic field generated by the rotor of the synchro transmitter to the tuning synchro control transformer B1 in the 51Y-4/4A. The manually positioned rotor of the synchro transmitter is energized by a 26-volt, 400-Hz supply voltage. The magnetic field of the rotor induces currents into the three stator windings which are in a plane with equally spaced angles (120 degrees) between them. The time of maximum current is the same in all windings; although, for any one position, the same maximum current is not obtained in all windings. The induced currents are transferred to three respective and equally spaced stator windings in the tuning synchro control transformer of the 51Y-4/4A. The currents in the three stators produce magnetic fields that, when added, result in a magnetic field with the same



Tuning Servo Amplifier, Simplified Schematic Diagram
Figure 19

relative phase and direction as the original field produced by the synchro transmitter rotor. The rotor of the synchro control transformer has a figure-eight receiving pattern. Nulls are obtained with the apparent signal source on either end of the rotor axis. Maximum voltage is induced into the coil when the apparent signal source is perpendicular to the sides of the rotor coil. The signals induced from sources in opposite lobes of the figure-eight pattern are 180 degrees out of phase.

Induced voltages with high amplitude are attenuated by limiter diodes CR6 and CR9. This limiter permits a sensitive system at the low-voltage null points while preventing overdriving of the amplifier at maximum induced voltages. The voltage from the limiter is amplified in Q26 and Q27. The collector of Q27 energizes the primary winding of driver transformer T19.

Pins 3 and 5 of the T19 secondary have the same ac polarity. On half-cycles during which the base-emitter junction of Q28 is forward biased, the base-emitter of Q29 is reverse biased. Therefore Q28 conducts and has low resistance while Q29 is cut off and has high resistance. During this half-cycle, the collector of Q29 is near ground. When Q28 is cut off and Q29 conducts, the collector of Q29 is at a high positive voltage. This 400-Hz voltage on the collector of Q29 is coupled through capacitor C74 to the control-phase winding of MG1.

The 400-Hz voltage energizes the control-phase winding of the 2-phase tuning motor-generator MG1. The reference-phase winding is energized by the 26-volt, 400-Hz aircraft supply voltage. The voltage in the control-phase winding of the motor either leads or lags the reference-phase voltage by 90 degrees. The direction of rotation of the motor (and of the rotor of synchro B1 to which it is geared) changes as the control-phase voltage shifts from leading to lagging phase. This phase shift (and rotation direction change) occurs as a null of the synchro transformer rotor pattern crosses the apparent signal source. Therefore, the rotor is always turned toward one null and away from the other null. Tuning capacitor C1, which is geared to motor-generator MG1, is at the selected position when the apparent signal source is within the true rotor null.

The position of the synchro transmitter rotor in the 614L-8 is changed by selecting a different frequency with the 614L-8 TUNE knob. This changes the apparent signal source direction in the synchro control transformer in the 51Y-4/4A. An error signal is induced into the tuning servo amplifier. The synchro rotor and tuning capacitor then are rotated to the new position. To prevent overshoot and continual searching around the true null position, a rate feedback generator is attached to the motor. The rate generator output, which is proportional to motor-generator speed, is fed back to the base of Q26 through variable resistor R111. Since the generator output is 180 degrees out of phase with the input voltage at Q26, the effective voltage is reduced.

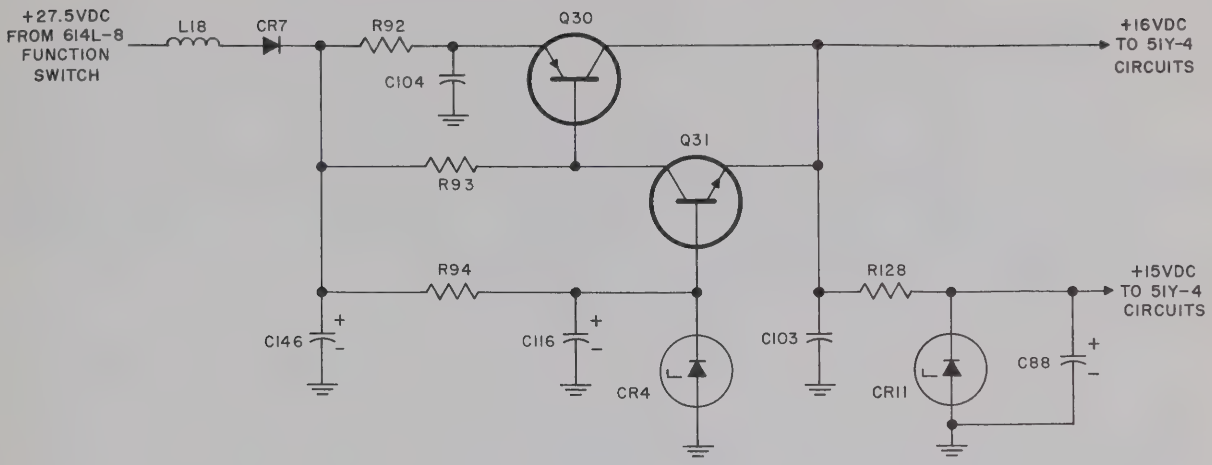
(16) Band- and Mode-Switching System.

Switch S1-M of the 51Y-4/4A is a multiwafer combination band and mode switch. Each wafer of switch S1-M is divided into three equal parts with each third representing a particular mode. A +27.5-volt dc voltage is applied to two of the three mode wires in the 614L-8 while the third is left open. This ±27.5 volts dc is applied through wafer S1-M rear to band mode switch motor B2 in the 51Y-4/4A. As motor B2 rotates switch S1 (including wafer S1-M rear), the two positions with +27.5-volt dc do not contact the switch rotor. At the same time the position with no voltage is in contact with the switch rotor. Switch S1-M is then in the third of its angle which activates the circuits of the mode represented by the open wire in the 614L-8.

Switch S1-M may come to rest at any of three positions within the appropriate third of switch rotation depending upon band selected on the 614L-8. There are a total of nine possible positions at which band/mode-switch S1 may be set. (Switch S1 is actually a 12-position switch, but one position between each third of rotation is blank.) Switches in the 614L-8 apply +27.5 volts dc to two of the three band-switch wires which are connected to contacts on switch wafer S1-M front. The third wire, which represents the band selected, is grounded through a low-value resistor in the 614L-8. The +27.5-volt dc is applied to band/mode-switch motor B2 through the rotor of S1-M front until the position is reached which is grounded in the 614L-8. Motor B2 then is braked by the ground and stopped if mode selection wafer S1-M rear is in the proper third of switch rotation; +27.5 volts dc is developed across the grounded resistor in the 614L-8. Motor B2 then rotates through this position and stops when the second or third rotor contact of S1-M front is at the grounded position.

(17) DC Voltage Regulator.

A simplified schematic of the dc series regulator is shown in figure 20. The voltage drop across the series transistor, Q30, increases whenever the voltage at the output is increased. Conversely, whenever the output voltage is decreased, the voltage drop across Q30 decreases. Thus the voltage drop across Q30 compensates for fluctuations in input voltage maintaining a constant output voltage.



DC Series Regulator, Simplified Schematic Diagram
Figure 20

The output voltage is normally 1 volt lower than the reference voltage, the voltage across breakdown diode CR4. This difference in potential means that Q31 is forward biased. If the output voltage is too high, the forward bias between base and emitter of Q31 increases. The increased collector current in Q31 increases the voltage drop across R93, resulting in a reduction of the base potential of Q30. A drop in base potential of Q30 decreases the base-to-emitter bias of that transistor, thus increasing the collector to emitter voltage drop. Thus, the output voltage at the collector of Q30 is reduced to the normal value. If the output voltage of the dc series regulator is too low, the induced current and voltage changes will be opposite those just described. The result is that the output voltage of the regulator remains nearly constant even with large variations in aircraft supply voltage. The input to the dc series regulator is filtered by L18 and C123. Diode CR7 protects the 51Y-4/4A circuitry from reversed polarity power input.

The output of the dc series regulator is connected to a second regulator consisting of R128, CR11, and C88. Diode CR11 is a breakdown type. The voltage drop across this diode is a constant 15 volts with the difference between the dc series regulator output voltage and the potential across CR11 dissipated by R128. This second voltage regulator provides a high degree of isolation between the circuits supplied by 16 volts and those supplied by 15 volts.

Breakdown diodes generate a considerable amount of electrical noise during conduction. For this reason breakdown diodes CR4 and CR11 are bypassed by capacitors C116 and C88 respectively.

(18) Self-Test Oscillator.

The self-test oscillator is activated when the 614L-8 (Collins part number 522-2357-024) CW-VOICE-TEST switch is placed in the TEST position. This applies a positive voltage to the base of Q33 which energizes relay K1 and also supplies operating bias for Q32. The output from the 100 kHz oscillator is applied to the receiver through the 150 pf sense antenna input. The 270 pf sense antenna input is connected to a 270 pf capacitor, C175, by the contacts of relay K1. The oscillator output is also applied to the S2 - S4 winding of resolver B3 so that when the oscillator is activated, the 51Y-4A can be tuned to a harmonic of the oscillator frequency and tested in ADF mode.

51Y-4/4A ADF Receiver - Disassembly

1. GENERAL.

Included within this section are instructions for the disassembly of the 51Y-4/4A ADF Receiver. Disassembly procedures should be accomplished only when repair is required. Do not perform the disassembly procedures as a part of routine maintenance. Disassembly procedures are arranged proceeding from the highest to the lowest subassembly. The disassembly of electronic equipment can usually be accomplished by inspection. However, if only one section of the 51Y-4/4A is to be disassembled, it is not necessary to perform the instructions of all the preceding paragraphs, except as noted.

CAUTION: BE SURE THAT THE POWER CABLE IS REMOVED BEFORE DISASSEMBLING ANY PORTION OF THE EQUIPMENT. FAILURE TO COMPLY MAY CAUSE VOLTAGE TRANSIENTS WHICH COULD DESTROY THE TRANSISTORS.

NOTE: Numbers in parentheses, following reference to a component of the gear case, are index numbers in figure 103.

2. DISASSEMBLY.

A. Removal of Dust Cover.

(1) Loosen two clamping screws at front of 51Y-4/4A on each side of dust cover.

(2) Loosen screw at rear of dust cover.

(3) Remove 51Y-4/4A from dust cover.

B. Access to Rear of Gearcase.

(1) Remove two outside, rearmost, screws on top of chassis.

(2) Remove two rearmost screws on bottom of chassis.

(3) Carefully swing rear of chassis to right as seen from front of 51Y-4/4A.

C. Removal of Switch Shaft.

(1) Remove dust plug from front panel of 51Y-4/4A.

(2) Loosen setscrews (8) on front of coupler (6) (refer to figure 103).

(3) Slide switch shaft toward front of 51Y-4/4A.

(4) Remove switch shaft from 51Y-4/4A through access hole in front panel.

D. Removal of Sense Amplifier.

(1) Remove switch shaft as described in paragraph 2.C and remove four screws (1, figures 101 and 102) securing radio-frequency amplifier subchassis to 51Y-4/4A chassis.

(2) Remove wires as necessary to withdraw subchassis as far as desired.

E. Removal of Balanced Modulator.

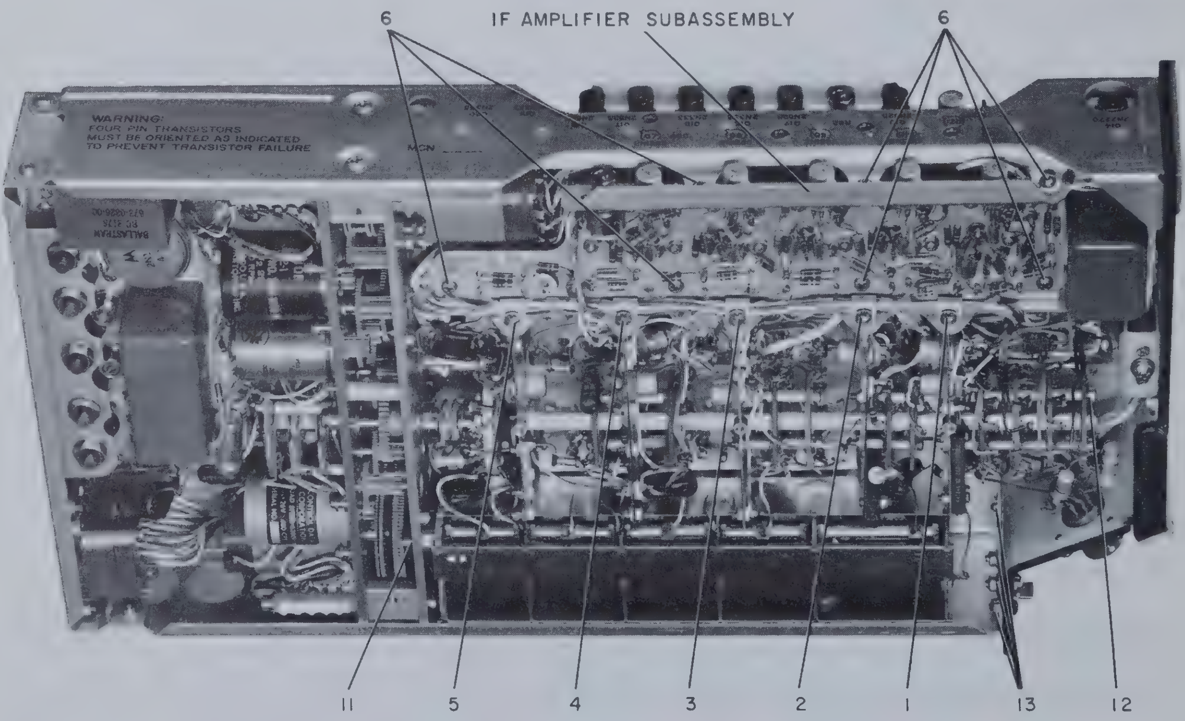
(1) Remove switch shaft as described in paragraph 2.C, and remove four screws (2, figures 101 and 102) securing balanced modulator subchassis to 51Y-4/4A chassis.

(2) Remove wires as necessary to withdraw balanced modulator as far as desired.

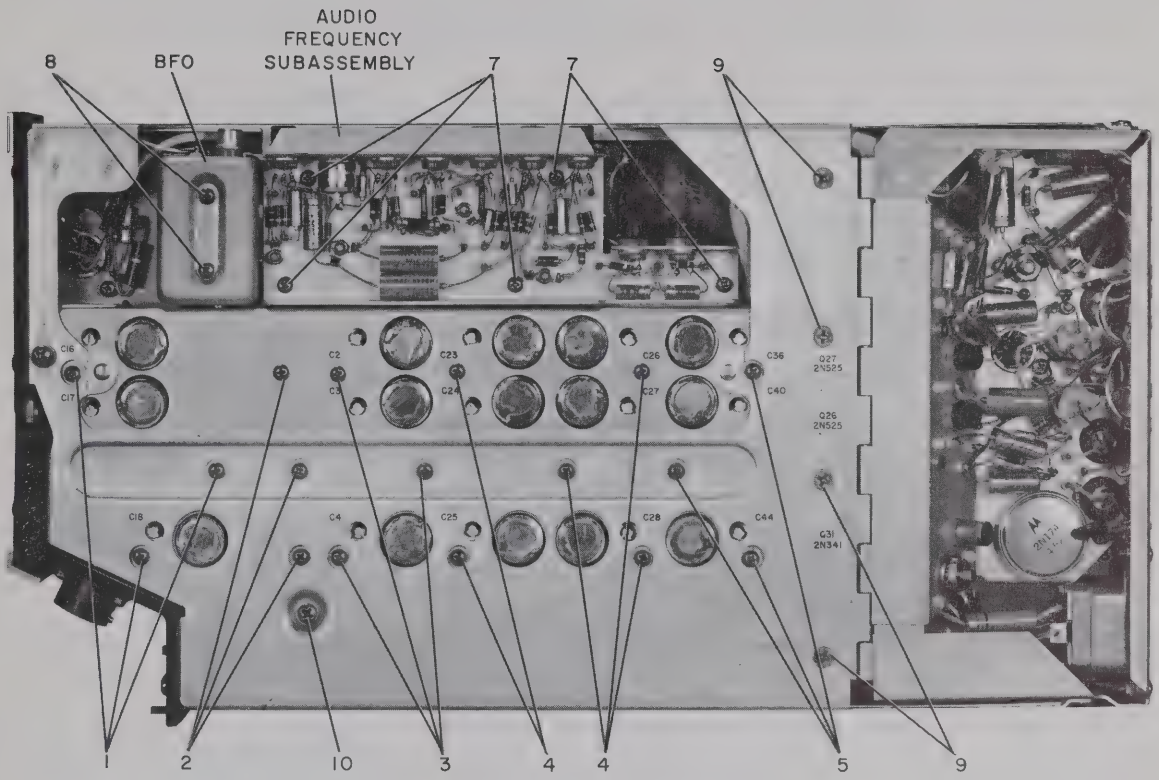
F. Removal of Loop Amplifier.

(1) Remove switch shaft as described in paragraph 2.C, and remove four screws (3, figures 101 and 102) securing loop amplifier subchassis to 51Y-4/4A chassis.

(2) Remove wires as necessary to withdraw loop amplifier as far as desired.


6
IF AMPLIFIER SUBASSEMBLY
6
WARNING:
FOUR PIN TRANSISTORS
MUST BE ORIENTED AS INDICATED
TO PREVENT TRANSISTOR FAILURE
11
5
4
3
2
1
13
12

51Y-4/4A ADF Receiver, Left Side
Figure 101


AUDIO FREQUENCY SUBASSEMBLY
8
BFO
7
7
9
C16
C17
C2
C3
C23
C24
C26
C27
C36
C40
Q27 2N525
Q26 2N525
C18
C4
C25
C28
C44
Q31 2N341
1
2
10
3
4
4
5
9

51Y-4/4A ADF Receiver, Right Side
Figure 102

G. Removal of Mixer.

(1) Remove switch shaft as described in paragraph 2.C, and remove six screws (4, figures 101 and 102) securing mixer subchassis to 51Y-4/4A chassis.

(2) Remove wires as necessary to withdraw mixer as far as desired.

H. Removal of Local Oscillator.

(1) Remove switch shaft as described in paragraph 2.C, and remove four screws (5, figures 101 and 102) securing local oscillator subchassis to 51Y-4/4A chassis.

(2) Remove wires as necessary to withdraw local oscillator as far as desired.

I. Removal of IF. Amplifier Subassembly.

NOTE: Refer to figure 101 for the location of the if. amplifier subassembly.

(1) Unsolder coaxial cable connected to pin 3 of Z1, and remove three screws at top of 51Y-4/4A chassis, securing if. amplifier subassembly to 51Y-4/4A chassis.

(2) Remove four screws from lower edge of if. amplifier subassembly and three screws (6, figure 101) from upper lip of if. amplifier subassembly.

(3) Withdraw if. amplifier subassembly from 51Y-4/4A chassis. It is not necessary to disconnect if. amplifier subassembly from 51Y-4/4A wiring harness (except the coaxial cable noted above) to effect inspection or repair.

J. Removal of Audio-Frequency Subassembly.

NOTE: Refer to figure 102 for the location of the audio-frequency subassembly.

(1) Remove five screws (7, figure 102) securing audio-frequency subassembly to 51Y-4/4A chassis.

(2) Withdraw audio-frequency subassembly from 51Y-4/4A chassis. It is not necessary to disconnect audio-frequency subassembly from 51Y-4/4A wiring harness to effect inspection or repair.

K. Removal of BFO.

NOTE: Refer to figure 102 for the location of the BFO.

(1) Remove two screws (8, figure 102) securing BFO to 51Y-4/4A chassis.

(2) Disconnect coaxial lead terminated at pin 3 of Z1.

L. Removal of Gearcase. (Refer to figure 103.)

NOTE: The gearcase cannot be removed from the 51Y-4/4A chassis unless the instructions given in paragraph 2.B have been carried out.

(1) Gain access to rear of gearcase as described in paragraph 2.B, and remove connecting lugs from terminals of resolver (52) and synchros (145, 162).

(2) Carefully remove wires of 51Y-4/4A wiring harness from two multiterminal posts (19, 36).

(3) Remove two leads to dc motor (153).

(4) Remove two screws (10), six washers (11) and two spacers (12) from switch assembly at rear of gearcase.

(5) Remove switch wafer (9) from switch shaft (106).

(6) Remove two screws (15), two washers (16) and four spacers (17, 18) from switch assembly at rear of gearcase.

(7) Remove switch wafers (13, 14) from switch shaft (106).

NOTE: Do not disconnect the leads to switch wafers (9, 13, or 14) unless replacement of a switch wafer is contemplated. If leads are removed, a note should be made of their original destination.

(8) Remove switch shaft as described in paragraph 2.C.

(9) Remove two screws (2) and gearcase cover (1) from gearcase.

(10) Remove screw in lower left corner of front bearing plate (11, figure 101) securing tuning capacitor to gearcase.

(11) Loosen two setscrews (31). Check that gear (33) is not binding on tuning capacitor shaft by sliding gear (33) toward center of gearcase.

(12) Remove two screws on top of the 51Y-4/4A chassis securing gearcase to chassis.

(13) Remove two screws on bottom of the 51Y-4/4A chassis securing gearcase to chassis.

(14) Remove four screws (9, figure 102) securing gearcase to right side of 51Y-4/4A chassis.

(15) Slide gearcase toward rear of 51Y-4/4A chassis until it is free of 51Y-4/4A, or obtain earlier freedom by springing top and bottom of chassis.

M. Removal of Tuning Capacitor.

(1) Perform procedures given in paragraphs 2.L.(9), (10), (11), and (13).

(2) Loosen lowest screw (9, figure 102) approximately three turns.

(3) Remove four front panel screws (13, figure 101).

(4) Disconnect all leads to tuning capacitor at tuning capacitor. The majority of these leads are terminated at wafer switches which are easily damaged during removal and replacement of leads.

(5) Remove screw (10, figure 102) securing tuning capacitor to 51Y-4/4A chassis.

(6) Slide tuning capacitor to front of 51Y-4/4A chassis. Spring bottom of chassis away enough to allow removal of tuning capacitor.

N. Disassembly of Gearcase. (Refer to figure 103.)

NOTE: The gearcase cannot be disassembled while installed in the 51Y-4/4A. Paragraph 2.L. provides instructions for removal of the gearcase from the 51Y-4/4A.

(1) Loosen four setscrews (80, 86).

(2) Loosen thirteen screws (163, 158, 154, 150, and 146).

(3) Remove two screws (20, 37), two lockwashers (21, 38), and two flat washers (22, 39).

(4) Rotate rim-clinching clamps on screws loosened in step (2) until they clear notches at bottom of motors and synchros.

(5) Remove synchro (145), motor (149), motor (153), motor (157), and synchro (162) from gearcase.

(6) Loosen two setscrews (74).

(7) Loosen three screws (53) and rotate rim-clinching clamps (55) until they clear notches at bottom of resolver (52).

(8) Remove resolver (52) from gearcase.

(9) Remove two screws (140), two lockwashers (141), two flat washers (142) , two rim-clinching clamps (143), and remove switch mounting plate (139) from gearcase.

(10) Remove four screws (57), four lockwashers (58), two screws (43), two lockwashers (45), two flat washers (46), two dowels (47), two screws (26), two lockwashers (28), two flat washers (29), two dowels (30), one screw (49), and one lockwasher (50) from gearcase.

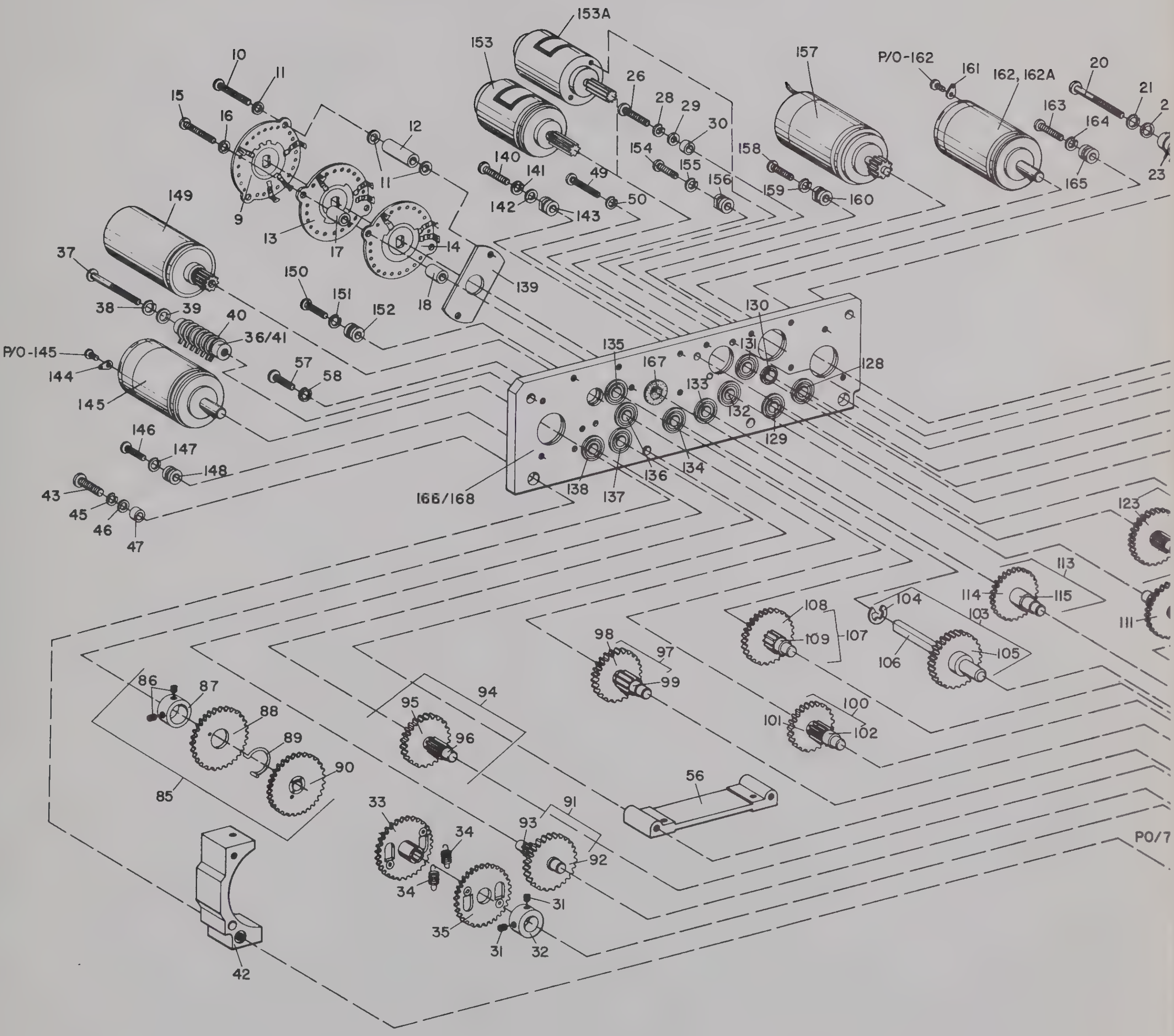
(11) Gently pull rear gearplate (166) away from the remaining gears and housings (25, 42).

(12) Loosen four setscrews (8), and remove coupling (6) from shaft (106).

(13) Remove gears from front gearplate (70).

(14) Remove bearings from front gearplate (70), and rear gearplate (166) if desired. Do not remove bushings (167, 71).

(15) Remove remaining screws in both plates (70, 166).


153A
153
157
P/0-162
161
162, 162A
20
10
11
26
28
29
30
21
2
15
16
12
163
164
154
155
156
158
159
160
165
23
11
140
141
49
50
142
143
149
9
13
17
14
37
150
151
152
18
139
38
39
40
36/41
P/0-145
144
57
58
145
130
135
131
167
133
128
132
129
146
147
148
166/168
138
137
136
134
43
45
46
47
123
113
114
115
104
103
111
108
109
107
106
105
98
97
99
86
87
88
89
90
85
94
95
96
100
101
102
56
33
34
34
35
91
93
92
31
31
32
42
P0/7

Gearcase, Exploded View
Figure 103

(4) Rotate rim-clinching clamps on screws loosened in step (2) until they clear notches at bottom of motors and synchros.

(5) Remove synchro (145), motor (149), motor (153), motor (157), and synchro (162) from gearcase.

(6) Loosen two setscrews (74).

(7) Loosen three screws (53) and rotate rim-clinching clamps (55) until they clear notches at bottom of resolver (52).

(8) Remove resolver (52) from gearcase.

(9) Remove two screws (140), two lockwashers (141), two flat washers (142) , two rim-clinching clamps (143), and remove switch mounting plate (139) from gearcase.

(10) Remove four screws (57), four lockwashers (58), two screws (43), two lockwashers (45), two flat washers (46), two dowels (47), two screws (26), two lockwashers (28), two flat washers (29), two dowels (30), one screw (49), and one lockwasher (50) from gearcase.

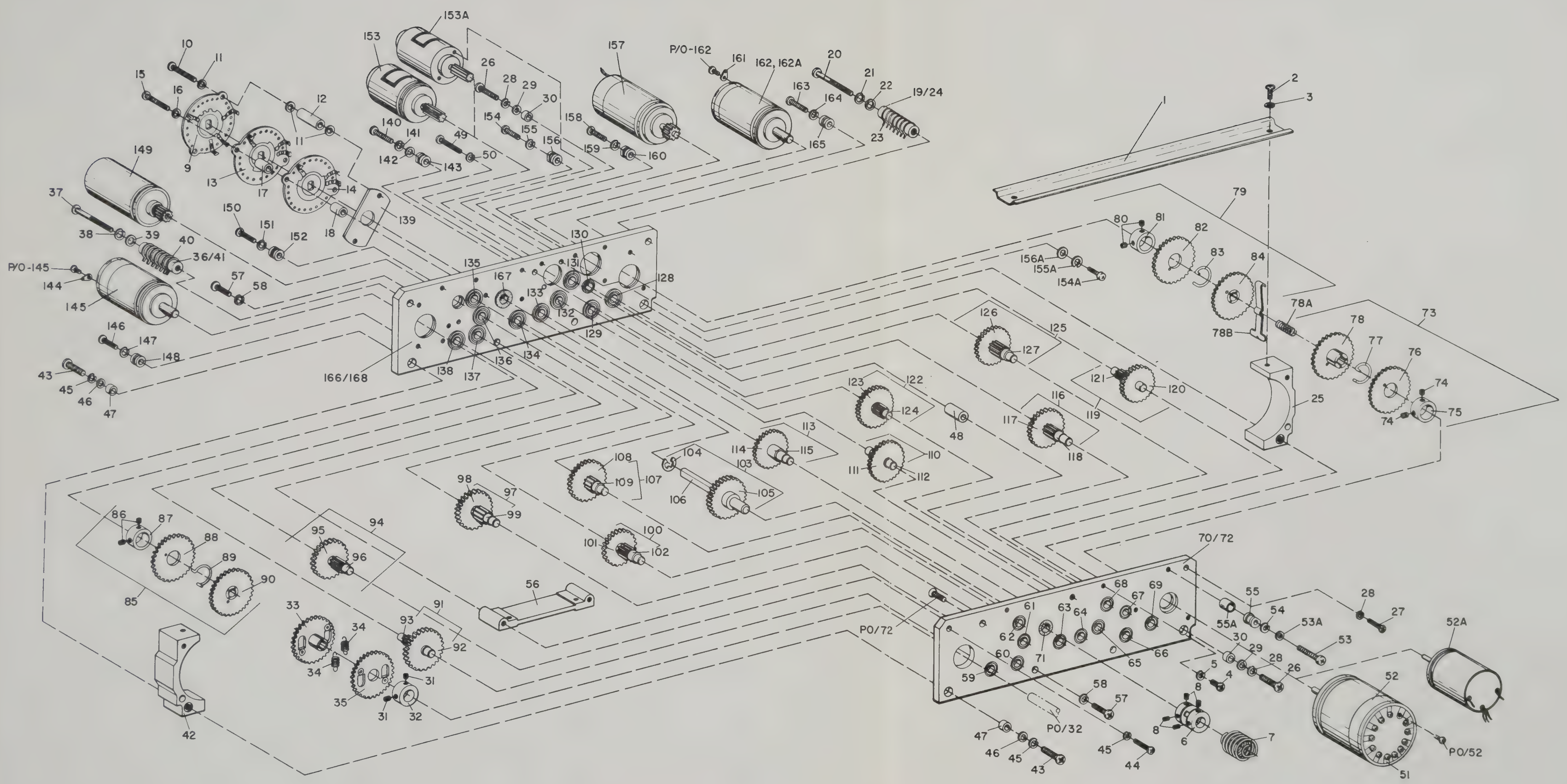
(11) Gently pull rear gearplate (166) away from the remaining gears and housings (25, 42).

(12) Loosen four setscrews (8), and remove coupling (6) from shaft (106).

(13) Remove gears from front gearplate (70).

(14) Remove bearings from front gearplate (70), and rear gearplate (166) if desired. Do not remove bushings (167, 71).

(15) Remove remaining screws in both plates (70, 166).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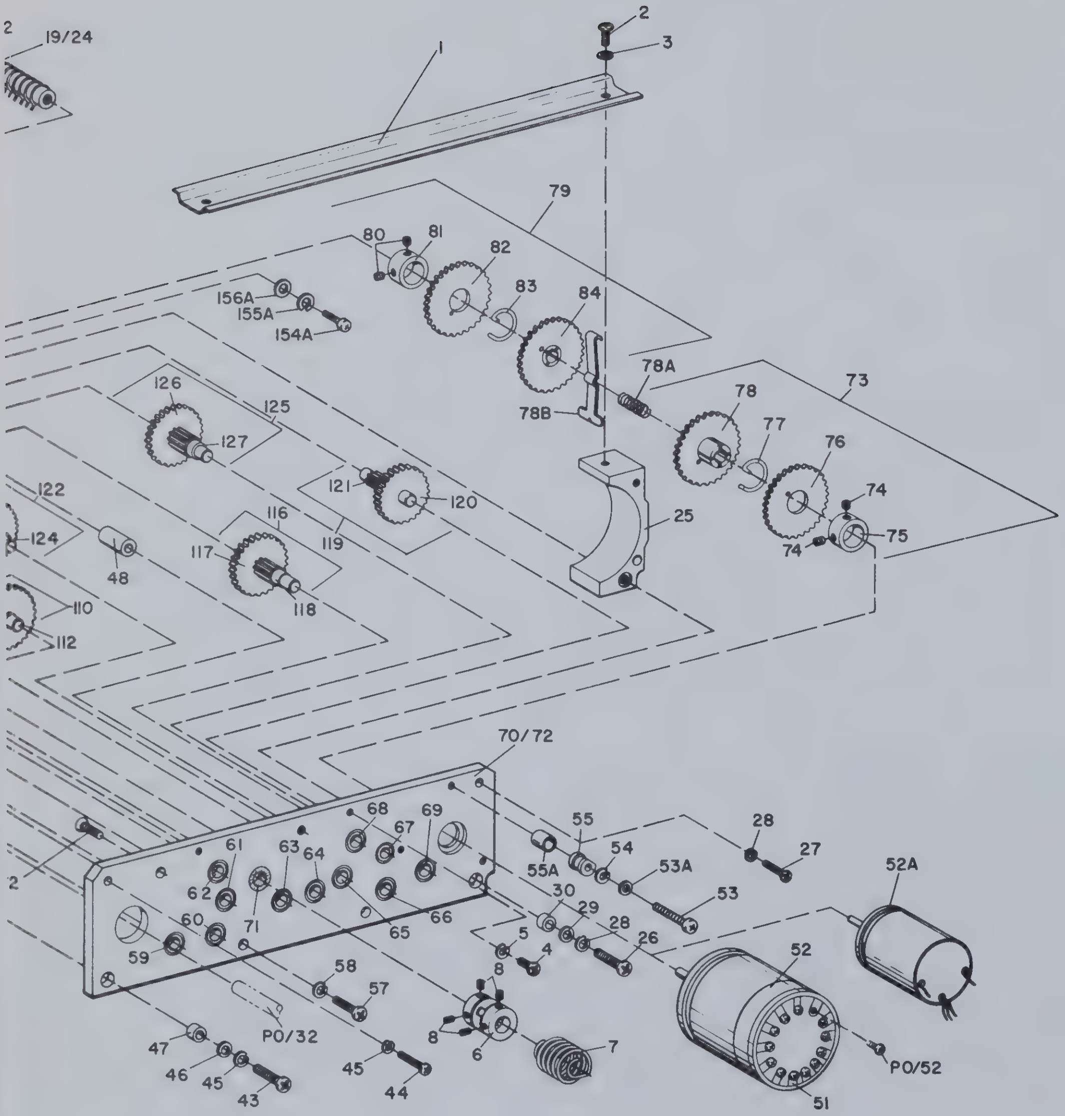
PO/32

Gearcase, Exploded View
Figure 103


19/24
70/72
PO/32
PO/52

51Y-4/4A ADF Receiver - Cleaning

1. GENERAL.

Included within this section are instructions for cleaning dismantled and disassembled components, subassemblies, and parts of the 51Y-4/4A ADF Receiver.

Wherever practical, instructions are in tabular form, arranged to facilitate reference by paragraph to the procedure for cleaning the various parts and assemblies. All parts requiring particular methods of cleaning are considered separately, and parts which are similar enough to permit identical cleaning procedures are grouped. The referenced cleaning agents are listed in figure 201.

CLEANING AGENT	DESCRIPTION
Solvent	Methylene chloride 25 percent (by volume) Perchloroethylene 5 percent (by volume) Dry-cleaning solvent Fed. Spec. P-S 661a, or equivalent, 70 percent (by volume)
Cloth	Soft cotton, lintless
Detergent	Commerical powder containing no bleach or abrasive.

Cleaning Agents
Figure 201

WARNING: PERFORM OPERATION INVOLVING CLEANING SOLVENT UNDER A VENTILATED HOOD. AVOID BREATHING SOLVENT VAPOR AND FUMES; WEAR A SUITABLE MASK WHEN NECESSARY. AVOID CONTINUOUS CONTACT WITH THE SOLVENT. USE GOGGLES, GLOVES, AND APRON TO PREVENT IRRITATION DUE TO PROLONGED CONTACT. CHANGE CLOTHING THAT HAS BECOME SATURATED WITH SOLVENTS. OBSERVE ALL FIRE PRECAUTIONS FOR FLAMMABLE MATERIALS. THESE MATERIALS SHOULD BE USED IN A HOOD PROVIDED WITH EXPLOSION-PROOF ELECTRICAL EQUIPMENT AND AN EXHAUST FAN WITH SPARKPROOF BLADES. OTHER PERSONS SHOULD BE WARNED TO KEEP AWAY FROM HAZARDOUS AREA OR WORKING ENCLOSURE.

References to air jet in this section indicate a hand-operated air nozzle supplied with clean and dry compressed air at a pressure of 28 pounds per square inch maximum.

WARNING: GOGGLES SHOULD BE WORN WHEN USING THE AIR JET TO BLOW DUST AND DIRT FROM EQUIPMENT PARTS. OTHER PERSONS SHOULD BE WARNED TO KEEP AWAY FROM HAZARDOUS AREA OR WORKING ENCLOSURE.

2. CLEANING PROCEDURES.

The following paragraphs provide instructions and procedures for cleaning the various parts of the dismantled and disassembled 51Y-4/4A preparatory to the inspection procedures. Figure 202 lists an index of cleaning procedures. Opposite each part to be cleaned, a paragraph containing the correct procedure is referenced. Refer to figure 202.

ITEM	REFER TO PARAGRAPH
Bearings, sealed and porous bronze	A
Cables, covered	B
Castings	C
Chassis, wired	D
Connectors	E
Covers and shields	F
Gears, metal and fiber	G
Insulators, ceramic or plastic	H
Jacks	I
Machined metal parts	J
Mechanical metal parts	K
Molded plastic parts	L
Sockets	M
Switches, concentric rf	N
Switches, wafer	O
Variable tuning capacitor	P

Index of Cleaning Procedures
Figure 202

A. Bearings, Sealed and Porous Bronze.

NOTE: Refer to figures 103 and 501 for location and type of all bearings.

Normally, sealed bearings require no cleaning or lubrication since they are lubricated by the manufacturer for lifetime operation. It is recommended that these bearings be replaced if faulty. However, under certain circumstances lubrication may be required. If lubrication is to be accomplished, bearings must be thoroughly cleaned as follows:

(1) Sealed Ball Bearings.

(a) Sealed ball bearings must be cleaned in a suitable bearing cleaning machine, such as spray cleaner or an ultrasonic installation. Observe manufacturer's instructions for proper use of these machines.

(b) Protect bearings from dust and moisture pending inspection. If bearings are not to be lubricated, protect bearings from dust and moisture pending inspection.

CAUTION: PERMANENT DAMAGE MAY RESULT FROM FORCIBLY SPINNING A BEARING BEFORE IT IS THOROUGHLY CLEANSED OF FOREIGN MATTER. BEARINGS MUST NOT BE HANDLED WITH BARE HANDS DURING AND AFTER CLEANING AND PRESERVATION. OPERATORS MUST WEAR RUBBER GLOVES OR FINGERSTALLS TO AVOID CONTAMINATION OF BEARINGS BY FINGERPRINTS. HANDLING SHOULD BE KEPT TO A MINIMUM.

(2) Porous Bronze Bearings.

It is recommended to not lubricate porous bronze bearings. However, under certain circumstances lubrication may be desired. If bearings are not to be lubricated, wipe dust from items that contain porous bronze bearings with a clean, dry, lintless cloth. Protect from dust and moisture pending inspection.

CAUTION: DO NOT SUBMERGE GEAR PLATES CONTAINING POROUS BRONZE BEARINGS IN SOLVENT. LUBRICANT IN OILITE BUSHINGS IN GEAR PLATES WOULD BE DILUTED AND CONTAMINATED BY DIRT IN THE SOLVENT. IF POROUS BRONZE BEARINGS HAVE BEEN REMOVED FROM GEAR PLATES, REPLACE WITH NEW BEARINGS.

B. Cables, Covered.

(1) Clean outer surface of flexible Vinylite conduit by wiping dirt from surfaces with a solvent-moistened, lintless cloth.

(2) Wipe dry using a clean, dry, lintless cloth.

(3) Treat any connector terminations as directed in paragraph D. Wipe lug terminations clean with a solvent-moistened, lintless cloth, and dry with a clean, dry, lintless cloth.

C. Castings.

Unfinished, finished, or partly finished casting should be cleaned as follows:

(1) Remove bulk of surface grease with rags.

(2) Blow dust from surfaces, holes, and recesses using air jet.

(3) Immerse casting in washing bath of solvent, and scrub until clean, working over all surfaces and into all holes and recesses with a suitable nonmetallic brush. Flat, wood-backed brushes with soft fiber bristles are recommended for surfaces; round brushes, similar to those used for washing bottles and test tubes, are recommended for holes and recesses.

(4) Raise casting from bath, and permit solvent to drain into bath.

(5) Immerse in rinsing bath of cleaning solvent, rinse, and raise from bath. Position casting to drain dry so that solvent is not trapped in holes or recesses. When practical positioning will not permit complete draining, use air jet to blow out any trapped solvent.

(6) When thoroughly dry, touch up any minor damage to finish. Extensive damage to finish may require complete refinishing.

(7) Protect casting from dust and moisture, pending inspection.

D. Chassis, Wired.

The following cleaning procedures should be used for chassis containing terminal boards, resistor and capacitor assemblies, rf coils, switches, tube sockets, inductors, transformers, and other wired parts.

(1) Remove dust and dirt from all surfaces, including parts and wiring, using soft-bristled brushes in conjunction with air jet.

CAUTION: AVOID AIR BLASTING SMALL COILS, LEADS, AND OTHER DELICATE PARTS BY TOO CLOSE AN APPROACH WITH AIR JET NOZZLE. USE CAUTION IN USE OF BRUSHES ON DELICATE PARTS.

NOTE: When necessary to disturb the dress of wiring and cables, dressing should be noted, and wiring and cables restored to positions and dress after cleaning is completed.

(2) Clean jacks as instructed in paragraph I.

(3) Clean sockets as instructed in paragraph M.

(4) With minimum disturbance of wiring, clean connectors as prescribed in paragraph E.

(5) Clean wafer switches as instructed in paragraph O.

(6) Clean ceramic or plastic insulators as instructed in paragraph H.

(7) Complete chassis cleaning by wiping all finished surfaces with a solvent-moistened, lintless cloth.

(8) Dry and polish these surfaces, using a dry, clean, lintless cloth.

(9) Protect chassis from dust, moisture, and damage, pending inspection.

E. Connectors.

(1) Wipe dust and dirt from bodies, shells, and cable clamps using solvent-moistened, lintless cloth. Wipe dry with a clean, dry, lintless cloth.

(2) Remove dust from inserts using a small soft-bristled brush and air jet.

(3) Wash dirt and any traces of lubricant from inserts, insulation, and contacts using a solvent applied sparingly with a small camel-hair brush.

CAUTION: DO NOT ALLOW SOLVENT TO RUN INTO SLEEVES OR CONDUIT COVERING ANY WIRES OR CABLES CONNECTED TO CONTACT TERMINALS OF THE INSERT.

(4) Dry insert with air jet.

F. Covers and Shields.

Clean all unfinished, finished, and partly finished sheet-metal covers, such as dust covers, inspection covers, chassis covers, and housings, according to applicable steps of procedures used for cleaning castings. Refer to paragraph C.

G. Gears, Metal, and Fiber.

If gear trains are disassembled for replacement or defective gears, the gears should be cleaned according to the following procedures:

(1) Metal gears should be cleaned according to applicable steps of paragraph J.

(2) Composition or plasticized gears and nylon friction clutches should be cleaned according to procedures given in steps (3) and (4).

(3) Remove all surface dust and dirt by using soft-bristled brush in conjunction with air jet.

(4) Using a clean, lintless cloth lightly moistened with solvent, clean composition gears by wiping clean.

CAUTION: SOLVENT SHOULD NOT BE USED TO CLEAN GEARS COMPOSED OF OR CONTAINING NYLON. CLEAN THESE GEARS USING A WASHING BATH OF 2 OUNCES OF DETERGENT POWDER TO A GALLON OF WATER AND USING SUITABLE BRUSHES TO REMOVE SURFACE DIRT OR FOREIGN MATTER. GEARS COMPOSED OF EPOXY AND SUPPORTING BASE MATERIAL ARE SUSCEPTIBLE TO SOFTENING IF SOLVENT IS APPLIED FOR EXCESSIVE PERIODS OF TIME OR IF EXCESSIVE AMOUNTS OF

SOLVENT ARE USED. USE CARE IN CLEANING THESE GEARS WITH SOLVENT, AND DRY WITH CLEAN, LINTLESS CLOTH.

H. Insulators, Ceramic or Plastic.

Clean all ceramic insulators and plastic standoff insulators as follows:

(1) Wipe clean with clean, lintless cloth lightly moistened with solvent.

(2) Wipe dry and polish using dry, clean, lintless cloth.

I. Jacks.

(1) Remove dust from exteriors with a camel-hair brush and air jet.

(2) Blow dust from interior of female contact with air jet.

J. Machined Metal Parts.

Detached shafts, keys, pins, collars, worms, spring, and similar machined parts should be cleaned in a suitable cleaning machine, if available; otherwise, proceed as follows:

(1) Use procedures listed in steps (1), (3), (4), and (5) of paragraph C and steps (2) and (3) of this paragraph.

CAUTION: TO PREVENT CORROSION, AVOID TOUCHING WITH BARE HANDS ANY MACHINED OR NONFINISHED SURFACES AFTER CLEANING.

(2) Dry in dust-free, dry area or suitable enclosure. Radiant heat used in a ventilated enclosure is recommended for drying, particularly where atmospheric humidity is high.

(3) When dry, immediately apply a light coat of MIL-L-6085 lubricating oil to any bare steel surfaces.

K. Mechanical Metal Parts.

The detached miscellaneous mechanical metal parts include ventilating grilles, mounting plates, mounting clamps and brackets, nuts, bolts, screws, washers, handles, fasteners, and hardware. These should be cleaned in a suitable cleaning machine or according to applicable steps of procedures for castings. Refer to paragraph C.

L. Molded Plastic Parts.

Plastic parts include insulating members, terminal boards, mounting blocks, etc. These should be cleaned in the following manner.

(1) Using an air jet, blow loose dust and dirt from surfaces, holes, and crevices.

(2) Wipe clean using a solvent-moistened, lintless cloth.

(3) Dry and polish with a clean, dry, lintless cloth.

M. Sockets.

Bakelite sockets are cleaned as follows:

(1) Remove any resin adhering to silver-plated contacts using a hardwood stick dressing to a wedge point.

CAUTION: DO NOT USE METAL TOOLS TO REMOVE FOREIGN MATTER FROM THESE CONTACTS, AS DAMAGE TO THE CONTACT PLATING INVITES CORROSION WHICH ULTIMATELY MAY END IN EQUIPMENT FAILURE. EXISTING CORROSION ON CONTACTS SHOULD NOT BE DISTURBED. ITS PRESENCE WILL INDICATE POSITIVE DAMAGE OF PLATING TO INSPECTION AND NECESSITY FOR SOCKET REPLACEMENT.

(2) Wash contacts with solvent applied lightly with small, soft-bristled brush.

(3) Using a solvent-moistened, lintless cloth, remove any foreign matter adhering to socket body or wafer.

(4) Dry all parts with air jet.

N. Switches, Concentric RF.

Clean all concentric rf switches as follows:

(1) Carefully remove dust with air jet, gently turning switch rotor while applying air.

(2) Carefully wash only movable and stationary contacts with solvent applied lightly with a small brush.

(3) Dry carefully with air jet; take care that solvent is not blown into switch bearings.

O. Switches, Wafer.

Clean switches of the phenolic wafer type as follows:

(1) Remove all dust with air jet, turning switch rotor back and forth several times while blowing.

(2) Wash all contacts and insulation with solvent lightly applied with a small, camel-hair brush.

(3) Dry with air jet; then repeat wash using clean solvent while rotating switch rotor.

P. Variable Tuning Capacitor.

Use a low-velocity air jet to blow dust from plates. Remove residual dirt with solvent applied with a brush. Use care not to wash dirt into ball bearings.

51Y-4/4A ADF Receiver - Inspection/Check

1. GENERAL.

Included within this section are instructions necessary to verify, by inspection, the condition of disassembled and cleaned assemblies of the 51Y-4/4A. Inspection will reveal defects that result from wear, physical damage, deterioration, or other causes. Detailed inspection procedures are arranged alphabetically. Wear tolerances are listed in the fits and clearances section of this manual where applicable. Refer to the repair section of this manual for replacement of defective components. Refer to the illustrated parts list in this manual for a description and Collins part number of the components which are to be replaced.

2. INSPECTION PROCEDURES.

Figure 301 lists mechanical and electrical parts to be inspected and contains references to applicable paragraphs.

REFERENCE	PARAGRAPH
Bearings	A
Capacitors	B
Castings	C
Chassis	D
Connectors	E
Covers and shields	F
Gaskets and seals	G
Gears, metal and fiber	H
Insulators, ceramic or plastic	I
Jacks	J
Machined metal parts	K
Mechanical metal parts	L

Index of Inspection Procedures (Sheet 1 of 2)
Figure 301

REFERENCE	PARAGRAPH
Molded plastic parts	M
Printed circuit boards	N
Rf coils	O
Receptacles	P
Resistors	Q
Semiconductors	R
Sockets	S
Switch wafers, rotary	T
Soldered terminal connections	U
Transformers and reactors	V
Variable tuning capacitor	W
Wiring	X

Index of Inspection Procedures (Sheet 2 of 2)
Figure 301

A. Bearings.

(1) Bearings, Porous Bronze.

Inspect bearings for pitted, scarred, or scuffed load-bearing surfaces. Inspect for burns, corrosion, and any other abnormal conditions occurring on load-bearing surfaces.

CAUTION: IF POROUS BRONZE BEARINGS HAVE BEEN REMOVED FROM GEARPLATES, REPLACE WITH NEW BEARINGS.

(2) Bearings, Ball.

The following inspection procedure applies to all ball bearings of the shielded type found in this equipment. After the bearing has been cleaned, it is inspected to determine whether it is serviceable, and the bearing is cleaned again. After final cleaning, lubricate for installation. Inspect bearings as outlined below:

CAUTION: ALL INSPECTION WORK MUST BE PERFORMED UNDER CONDITIONS OF EXTREME CLEANLINESS. OPERATORS MUST WEAR RUBBER GLOVES OR FINGERSTALLS TO PREVENT CORROSION DUE TO FINGERPRINT CONTAMINATION WHEN HANDLING BEARINGS.

(a) Check for blue or purple discoloration of any part of bearing due to overheating.

(b) Check for tarnished external surfaces. This is indicated by a light discoloration of highly finished surfaces.

(c) Check for rust.

(d) Check for pitted, scarred, scuffed, or galled surfaces of bearings, balls, and races.

(e) Check for flat bearing balls, broken ball separators, flaking or spalling of load-carrying surfaces, and all other abnormal conditions.

In addition to the above inspection, refer to the fits and clearances section of this manual, and check for undersized od (outside diameter) caused by creepage of outer race in its housing. This applies to all ball bearings, with races that do not separate when the bearing is removed from companion parts. Also, check with a plug gauge for oversize or defective bore caused by the inner race having turned on its shaft and for excessive radial play. Use a suitable radial gauge equipped with a dial indicator calibrated in ten-thousandths inch when checking radial play of each bearing. A noise inspection of this type of bearing can be accomplished by mechanical rotation. If motor-driven, the bearing should be lubricated lightly with recommended lubricant (see lubricant chart, figure 501), and rotated at 500 to 1000 rpm. A dental lathe can be used to drive the inner race while the outer race is held in gloved fingers. A used but serviceable bearing will develop a certain amount of noise. A slight, uniform noise is to be expected, but loud noise, nonuniform noises, such as clicks or buzzes, and vibration originating in the bearing, indicate that it is unfit for service. If manually rotated, the bearing must be clean and dry (unlubricated), and the outer race should be spun with the gloved finger while the bearing is held by means of a bearing holder inserted in its bore. Hold the bearing in several positions while making the check, and listen for any vibration or intermittent resistance.

B. Capacitors.

Inspect capacitors for defects listed in figure 302.

C. Castings.

Inspect castings for cracks or breaks and marred or damaged machined surfaces, holes, counterbores, or threads. Determine whether finish requires touchup repairs.

DEFECT	METAL TYPE	MOLDED TYPE	CERAMIC TYPE
Leakage (at case seams or around terminal insulation)	X		
Cracked, broken, or charred terminal insulation	X		
Case damage (dents or holes)	X		
Case damage (cracks or breakage)		X	
Loose, broken, or corroded terminal studs, lugs, or leads	X	X	X
Loose, broken, or poorly soldered connections	X	X	X

Table of Fixed Capacitor Inspection
Figure 302

D. Chassis.

Inspect chassis for deformation, dents, punctures, badly worn surfaces, damaged connectors, damaged fastener devices, or damaged handles. Inspect for corrosion and damage to finish that requires work in finishing department.

E. Connectors.

Inspect connector bodies for broken parts, deformed shells or clamps, and other irregularities. Inspect for cracked or broken insulation and for contacts that are broken, deformed, or out of alignment. Inspect for corroded or damaged plating on contacts and for loose, poorly soldered, broken, or corroded terminal connections.

F. Covers and Shields.

Inspect covers and shields, for punctures, deep dents, and badly worn surfaces. Inspect for damaged fastener devices, corrosions, and damage to finish that requires work in finishing department.

G. Gaskets and Seals.

Inspect gaskets and seals for deformation and for damage, such as tears, creases, rough surfaces, and imbedded foreign matter.

H. Gears, Metal and Fiber.

Inspect gears for broken, chipped, or badly worn teeth. Inspect gear bodies for cracks and deformation. Inspect surfaces for corrosion or other abnormal conditions.

I. Insulators, Ceramic or Plastic.

Inspect ceramic or plastic insulators for evidence of damage, such as broken or chipped edges, burned areas, or presence of foreign material.

J. Jacks.

Inpsect jacks for corrosion, rust, loose or broken parts, cracked insulation, bad contacts, and other irregularities.

K. Machined Metal Parts.

Inspect machined metal parts for physical damage to surfaces, corners, and edges. Inspect closely all machined surfaces, holes, bores, counterbores, slots, grooves, shoulder, flanges, teeth, tapped holes, and all threaded members, both male and female, for physical damage of any sort including roughness of surface, corrosion, or presence of foreign matter. Inspect plated or finished areas for damage requiring replating or refinishing beyond touch-up repair.

L. Mechanical Metal Parts.

Inspect mechanical metal parts, including mounting plates, chassis, mounting clamps and brackets, nuts, bolts, screws, washers, handles, fasteners, and hardware, for physical damage or deformation. Inspect for corrosion and any damage which would require replating or refinishing beyond practical touchup.

M. Molded Plastic Parts.

Inspect molded plastic parts, such as terminal boards, mounting blocks, and insulating members, for signs of corrosion, cracked or charred insulation, and loose or missing mounting hardware. Inspect for other abnormal indications which might be a source of future breakdown.

N. Printed Circuit Boards.

Inspect printed circuit boards for loose, broken, corroded, or poorly soldered terminal connections. Inspect printed circuits for any evidence of damage, such as burned, broken, cracked, or corroded plating. Inspect for loose mounting of printed circuit boards.

O. RF Coils.

Inspect rf coils for broken leads and loose, poorly soldered, or broken terminal connections. Inspect for crushed, scratched, cut, bruised or charred windings; corrosion on windings, leads, terminals, and connections; and for physical damage to forms.

P. Receptacles.

Inspect receptacles for cracked, broken, or charred insulation. Inspect for physical damage to all other parts, loose or bent contacts, damage to contact plating, corrosion, and other abnormal conditions.

Q. Resistors.

Inspect fixed composition resistors for cracked, broken, blistered, or charred bodies and loose, broken, poorly soldered, or corroded terminal connections.

Inspect fixed wire-wound resistors for signs of heating; cracked, broken, or charred insulation; loose, poorly soldered, broken, or corroded terminal connections; and loose mounting.

R. Semiconductors.

Inspect diodes, silicon controlled rectifiers, and transistors for cracked, broken, blistered, or charred bodies. Inspect for loose, broken, poorly soldered, or corroded terminal connections.

Check that nuts on top of all power transistors are tight. Check that mica insulating washers are in place between transistors and chassis.

S. Sockets.

Inspect sockets for loose, broken, or missing socket mounting rings. Inspect for cracked, broken, or charred insulation. Inspect for broken, corroded, or deformed contacts and loose, poorly soldered, broken, or corroded connections.

T. Switch Wafers, Rotary.

Inspect switch wafers for bent, weak, broken, or deformed contacts. Inspect for corrosion, damage to contact plating, and cracked or broken contact insulation. Check to see that movable contacts are free to rotate properly without binding throughout entire excursion. Inspect components mounted on switch wafers for physical damage.

U. Soldered Terminal Connections.

Inspect soldered terminal connections for cold-soldered or resin joints. These joints present a porous or dull, rough appearance. Check for strength of bond using the point of a tool. Examine for excess of solder; protrusions from the joint; pieces adhering to adjacent insulation; and particles lodged between joints, conductor, or other parts. Inspect for insufficient solder and unsoldered strands of wire protruding from conductor at joint. Also, look for insulation that is stripped back too far from joint or badly frayed at joint. Inspect for corrosion (verdigris) on copper conductor at the joint.

V. Transformers and Reactors.

Inspect transformers and reactors for signs of excessive heating, physical damage to case, cracked or broken ceramic insulators, and other irregularities. Inspect for corroded, poorly soldered, or loose terminals and loose, broken, or missing mounting hardware.

W. Variable Tuning Capacitor.

Check that the plates of the rotor do not touch the plates of the stator. Check that the rotor is easily turned with no sign of roughness in the bearings. Check that the wiper contacts which make connection to the rotor are resilient and are making good contact.

CAUTION: THE END PLATES ON EACH GROUP OF STATOR PLATES MAY BE BENT. THE PLATES HAVE BEEN BENT TO ADJUST THE CAPACITANCE OF EACH GROUP; DO NOT ATTEMPT TO STRAIGHTEN THE PLATES.

X. Wiring.

Inspect open and laced wiring of chassis, terminal boards, and parts of equipment by checking insulation for physical damage and charring. Inspect wires for breakage and for improper dress in relation to adjacent wiring and chassis.

51Y-4/4A ADF Receiver - Repair

1. GENERAL.

Included within this section are instructions for the replacement or repair of damaged or defective components of the 51Y-4/4A. Faulty components usually are detected through procedures in the inspection or testing section of this manual. If a new part is to be installed, it should first be inspected and tested. Refer to the illustrated parts list in this manual for a description and Collins part number of components which are to be replaced.

Most of the repair or replacement instructions apply to disassembled equipment. Refer to the disassembly section for proper instructions.

2. REPAIR PROCEDURES.

The following paragraphs provide instructions and procedures for repairing components of the equipment. Figure 401 lists an index of repair procedures, and opposite each repairable part a paragraph containing the correct procedure is referenced.

REFERENCE	PARAGRAPH
Bearings	A
Capacitors	B
Connectors	C
Covers and shields	D
Frame	E
Gears, metal and fiber	F
Resistors	G
Semiconductors	H
Soldered terminal connections	I
Switches	J
Transformers and inductors	K
Variable resistors	L
Wiring	M

Index of Repair Procedures
Figure 401

A. Bearings.

Shielded bearings will rarely need lubrication. If found defective, replacement with another bearing, new or known to be good, is advised.

B. Capacitors.

If found defective or suspected of causing difficulties, capacitors should be replaced. Clean all connections thoroughly, and apply new solder.

C. Connectors.

Straighten bent pins and damaged shell areas. Replace bad connections, broken wires, or wires with split insulation. If connector insert is broken, replace connector.

D. Covers and Shields.

Replace damaged screws, straighten any dents or warped sections, and retouch scratched or worn painted surfaces.

E. Frame.

Straighten misshapen areas. Remove all corrosion with a suitable cleaner. Retouch silk screening, and refinish where needed.

F. Gears, Metal and Fiber.

Metal or fiber gears should be replaced if found defective in inspection or testing sections. Instructions are given in assembly and disassembly sections of this manual.

G. Resistors.

Replace defective resistors with components known to be good, and carefully resolder bad connections.

H. Semiconductors.

(1) Maintenance and Repair of Transistorized Circuits.

When maintaining and repairing transistor circuits, observe the following factors:

(a) In a transistor amplifier, any change in the output circuit of one stage can affect all preceding stages. Therefore, any deviation in the operating characteristics of a certain stage can be reflected back to affect the operation of the preceding stages.

(b) Common-emitter transistor amplifiers have a 180-degree phase shift between the input and output voltages. However, there will be no phase shift between the input and output signals if the base is shorted to the collector of the transistor.

(c) The dc base voltage should be slightly higher than the emitter voltage during normal operation of a common-emitter transistor amplifier. However, an open circuit between the base and the emitter of the transistor will result in the emitter voltage approximating ground potential and a base voltage considerably greater than normal.

(d) An unusually high dc collector voltage can be caused by an open emitter circuit, an open collector circuit, or a short between the base and the emitter of the transistor. However, an open circuit either between the base and the emitter or in the load impedance of the stage under consideration will also cause an unusually high dc collector voltage.

(e) An unusually low dc collector voltage indicates a short circuit between the collector and ground, the collector and the emitter, the collector and the base, or across the output impedance.

When checking the base-to-emitter resistance of an npn transistor, the ground of the Voltohmyst must be connected to the emitter lead. The resistance indicated on the RX1 scale then should be greater than 10 ohms but less than 50 ohms. However, when the meter leads are reversed, the indicated emitter-to-base resistance will be several thousand times greater.

When soldering transistor leads to terminal points, use the same precautions normally followed when working with crystal diodes.

CAUTION: WHEN SOLDERING TRANSISTOR LEADS, USE PLIERS AS A HEAT SINK BY HOLDING BETWEEN THE TRANSISTOR AND THE POINT OF HEAT APPLICATION TO DIVERT THE HEAT FROM THE TRANSISTOR.

(2) Soldering Instructions.

(a) General.

Use a 35-watt iron to solder or unsolder all connections except ground connections made directly to the chassis. For ground connections to a chassis, use a 100-watt iron.

CAUTION: COMPONENT DRESS AND LEAD DRESS ARE CRITICAL. WHENEVER A COMPONENT OR A LENGTH OF WIRING IS BEING REPLACED, ENSURE THAT THE PROPER DRESS IS MAINTAINED. IN ALL REPAIR WORK WHICH INCLUDES THE REPLACEMENT OF WIRING, BE ESPECIALLY CAREFUL TO DUPLICATE THE ORIGINAL TYPE, LENGTH, AND ROUTING OF WIRES. TO ASSURE THE PROPER LEAD DRESS, USE ANOTHER UNIT AS A GUIDE.

I. Soldered Terminal Connections.

Resolder cold-solder or resin joints. Remove all traces of corrosion.

J. Switches.

Switches are usually replaced and seldom repaired. Wafers in wafer-type switches may be replaced separately and so may defective pins in the crimped-pin type of connector. Leads should be properly identified to simplify rewiring.

K. Transformers and Inductors.

Replace or resolder as required.

(1) Removal of Covers on Sealed Transformers and Inductors.

NOTE: Do not remove the covers of transformers or inductors unless adjustment is necessary.

(a) Allow a 200-watt soldering iron to reach operating temperature.

(b) Heat soldered end of transformer or inductor cover with soldering iron until solder is fluid. It is not necessary to remove coils from 51Y-4/4A.

(c) Insert a pick between cover and case of transformer or inductor. Gently pry cover away from case.

(2) Replacement of Covers on Sealed Transformers and Inductors.

(a) Clean edges of transformer or inductor cover with a scraper.

(b) Apply solder to cover and edge of case.

(c) Use soldering iron mentioned in previous paragraph to heat cover and case.

(d) Place cover into open end of inductor or transformer case, and apply sufficient solder to seal all gaps.

L. Variable Resistors.

Add a drop or two of contact cleaner (carbon tetrachloride) to windings of a resistor with rough operation. Clean corroded terminals. Replace resistor if shaft is loose in case.

M. Wiring.

Replace damaged wiring with wire of same size and color coding. Ensure that no bare wires are touching chassis, other bare wires, or metal cases of other parts.

If any wire is to be removed from a terminal or component, it should be marked with an identification tag to minimize incorrect connections.

NOTE: When necessary to disturb the dress of the wires, carefully ensure that the original wire dress is maintained when replacing wires.

51Y-4/4A ADF Receiver - Assembly

1. GENERAL.

Included in this section are assembly instructions and mechanical alignment procedures for the 51Y-4/4A. The order of assembly starts with the lowest subassembly or component proceeding to the completed module or equipment. Refer to the fits and clearances section of this manual for assembly tolerances and torque values. Required lubrication procedures are also listed in this section.

2. LUBRICATION DATA.

Figure 501 lists all items that can be lubricated prior to assembly, and specifies the type of lubricant to be used. The lubricants listed for each item in figure 501 must be used; no substitutions are recommended.

Paragraph 4 of this section provides lubrication instructions for items to be lubricated after assembly of the 51Y-4/4A.

DESCRIPTION	ITEM NUMBER (Refer to figure 103)	COLLINS PART NUMBER	LUBRICANT	LUBRICANT COLLINS PART NUMBER
Bearing, ball	59 through 66, 68, 69, 128, 129, and 131 through 138	309-1519-00	MIL-L-6085	005-0392-00
Bearing, ball	67 and 130	309-1518-00	MIL-L-6085	005-0392-00

51Y-4/4A Lubrication Data
Figure 501

A. Contamination and Compatibility.

Major contamination problems which arise between conventional lubricants and silicone lubricants or hydraulic fluids are a result of some additives used in conventional lubricants (oxidation inhibitors, corrosion inhibitors, etc.). Many of these additives are not soluble in silicone lubricants and will be precipitated as gummy or crystalline sludges when the fluids are mixed. When inadequate cleaning procedures lead to this type of contamination, high torques, sticking mechanisms, lubrication failure, and ultimate equipment failure may result. The importance of maintaining the correct lubricant in bearings or other areas cannot be emphasized too strongly. Since failure can result from improper use of lubricants, it is imperative that the correct lubricants be used in the right place and in the right amount.

B. Bearings.

(1) Ball Bearings.

It is recommended that ball bearings not be lubricated; however, under certain circumstances, lubrication may be necessary. Figure 501 incorporates all bearing lubrication data required.

CAUTION: ENSURE THAT BALL BEARINGS ARE COMPLETELY CLEAN BEFORE LUBRICATING.

CAUTION: DO NOT OVERLUBRICATE ANY BEARING.

(2) Bronze Bearings.

It is recommended that bronze bearings not be lubricated; however, under certain circumstances, lubrication may be necessary. Reference should be made to figure 501.

CAUTION: DO NOT OVERLUBRICATE ANY BEARING. IF A PRESS FIT BRONZE BEARING IS REMOVED, IT MUST BE REPLACED WITH A NEW BEARING.

3. ASSEMBLY.

A. Assembly of Gear Case. (Refer to figure 103.)

(1) Insert ball bearings (59 through 69) into front gear plate (72). Front gear plate (72) may be distinguished from rear gear plate (168) by holes in each plate. Rear gear plate (166) provides mounting holes for servomotors. Ball bearings (59 through 66, 68, 69) are identical. They have been numbered differently as an aid to establishing correct location of gears in a later step. Ball bearing (67) is smaller than the others and will fit only in the correct hole in front gear plate (72). Each ball bearing has a shoulder which should be against the inner surface of front gear plate (72).

(2) Place gear (119) into bearing (69). Gear (119) has fewer teeth than gear (91).

NOTE: Gears may be identified by reference to figure 103. The profile of each gear, except gears (119, 91), is unique.

(3) Place gear (122) into bearing (66).

(4) Place gear (116) into bearing (68).

(5) Place gear (125) into bearing (67).

(6) Insert shorter end of switch shaft (106) into Oilite sleeve bearing (71).

(7) Place gear (110) into bearing (65).

(8) Place gear (107) into bearing (63).

(9) Place gear (113) into bearing (64).

(10) Place gear (91) into bearing (59).

(11) Place gear (94) into bearing (60).

(12) Place gear (97) into bearing (61).

(13) Place gear (100) into bearing (62).

(14) Use three screws (53) and three lockwashers (54) to secure three rim clinching clamps (55) loosely to outside of front gear plate (70).

(15) Place resolver shaft (52) between rim clinching clamps (55). Rotate rim clinching clamps (55) until they engage notch on resolver (52), and tighten three screws (53).

(16) Give spur gear assembly (73) a right-hand loading of six teeth after taking up slack. Hold spur gears (78, 76) so that loading is not lost.

(17) Place spur gear assembly (73) on resolver shaft (52) with gear collar (75) toward resolver shaft (52). Both spur gears (78, 76) should be engaged with section of pinion (121) nearest resolver shaft (52).

(18) Lightly tighten two setscrews (74).

(19) Fasten gear case housings (25, 42) to inside of front gear plate (70) using screws (26, 27, 43, 44), lockwashers (28, 45), washers (29, 46), and dowels (30, 47). Screws (26, 43) associated with dowels shall be tightened first.

(20) Fasten gear case side plate (56) to inside of gear case using four screws (57) and four lockwashers (58).

(21) Place retaining ring (104) on switch shaft (106) if not still in place.

(22) Insert bearings (128, 138) into rear gear plate (166) as shown in figure 103.

(23) Place spur gear assemblies (85, 33/35) back to back and in position near gear (91) as shown in figure 103.

(24) Mate bearings on rear gear plate (166) with spur gears installed on front gear plate (70). Do not force rear gear plate (166) into place.

(25) Fasten rear gear plate (166) using screws (43, 57), lockwashers (58, 45), flat washers (46, 29), and dowels (30, 47). Screws (26, 43) associated with dowels should be tightened first.

(26) Place spur gear assembly (79) in position near gear (119).

(27) Insert synchro shaft (162) into hole in rear gear plate (166) while sliding spur gear assembly (79) onto synchro shaft.

(28) Spur gear assembly (79) need not be loaded until bearing alignment is performed.

(29) Use three screws (163), three lockwashers (164), and three rim clinching clamps (165) to fasten synchro shaft (162) to rear gear plate (166).

(30) Use two screws (158), two lockwashers (159), and two rim clinching clamps (160) to fasten servomotor (157) to rear gear plate (166). Servomotor leads should be toward upper end of gear case.

(31) Insert end of synchro (145) into hole in rear gear plate (166) while sliding spur gear assembly (85) onto synchro shaft.

(32) Use three screws (146), three lockwashers (147), and three rim clinching clamps (148) to secure synchro (145) to rear gear plate (166).

(33) Give spur gear assembly (85) a right-hand loading of five teeth after taking up slack. Engage entire spur gear assembly (85) with gear (91) without losing any loading.

(34) Use screws (150), lockwashers (151), and clamps (152) to fasten servomotor (149) to rear gear plate (166). Leads from servomotor should be toward lower end of gear case.

(35) Use three screws (154), three lockwashers (155), and three rim clinching clamps (156) to fasten motor (153) to rear gear plate (166).

(36) Place sleeve spacer (48) between rear gear plate (166) and front gear plate (70). Secure sleeve spacer (48) with screw (49) and lockwasher (50).

(37) Secure two multiterminal standoffs (19, 36) to upper left and lower left corners of gear case using two screws (20, 37), two lockwashers (21, 38), and two flat washers (22, 39).

B. Installation of Tuning Capacitor.

(1) Use screw and lockwasher (10, figure 102) to secure tuning capacitor to 51Y-4/4A chassis. The correct location of tuning capacitor is shown in figure 101.

(2) Reconnect leads to tuning capacitor. Refer to figures 810, 811 for connection of leads which have been removed from tuning capacitor.

C. Installation of Gear Case.

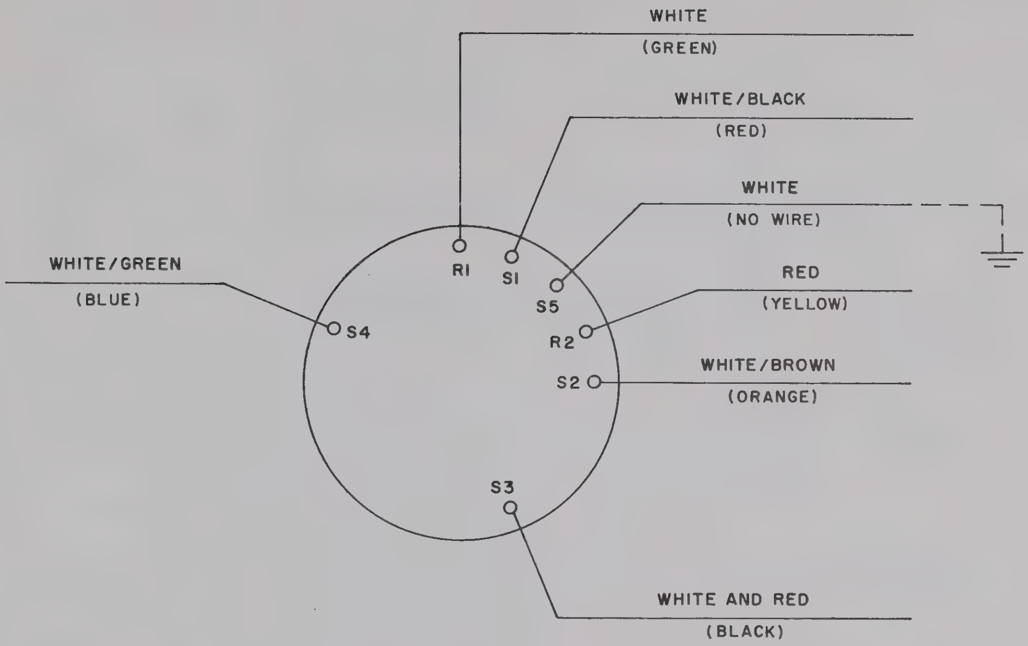
(1) Partially slide gear case into rear of 51Y-4/4A chassis. Be careful not to pinch wiring harness.

(2) Refer to figure 502 for proper connection of leads to resolver shaft (52). Make connections to resolver as indicated.

(3) Slide gear case toward front of 51Y-4/4A and ensure that gear (33) is seated on tuning capacitor shaft.

(4) Use four screws to fasten gear case housings (25, 42) to top and bottom of 51Y-4/4A chassis.

(5) Place hinge section on rear portion of 51Y-4/4A chassis between gear case and right side of chassis.



NOTE:
( ) DENOTES WIRE COLORS FOR RESOLVER USED ON 51Y-4 AND 51Y-4A WITH MCN NUMBERS ABOVE 1172 FOR 51Y-4 AND 636 FOR 51Y-4A. THE NEW RESOLVER DOES NOT PROVIDE SCREW TERMINALS FOR WIRE CONNECTIONS. WIRES NOT IN ( ), AND R1, R2, S1 THROUGH S5 DENOTE RESOLVER USED ON 51Y-4 AND 51Y-4A WITH MCN NUMBERS BELOW 1172 AND 636 RESPECTIVELY.

Connections to Resolver
Figure 502

(6) Secure hinge section of step (5) to gear case with four screws (9, figure 102).

(7) Loosen screw (10, figure 102). Insert and tighten screw (11, figure 101) which secures tuning capacitor to gear case.

(8) Load gears (33, 35) four teeth to the right after taking up slack. Engage both gears with gear (91) without diminishing loading.

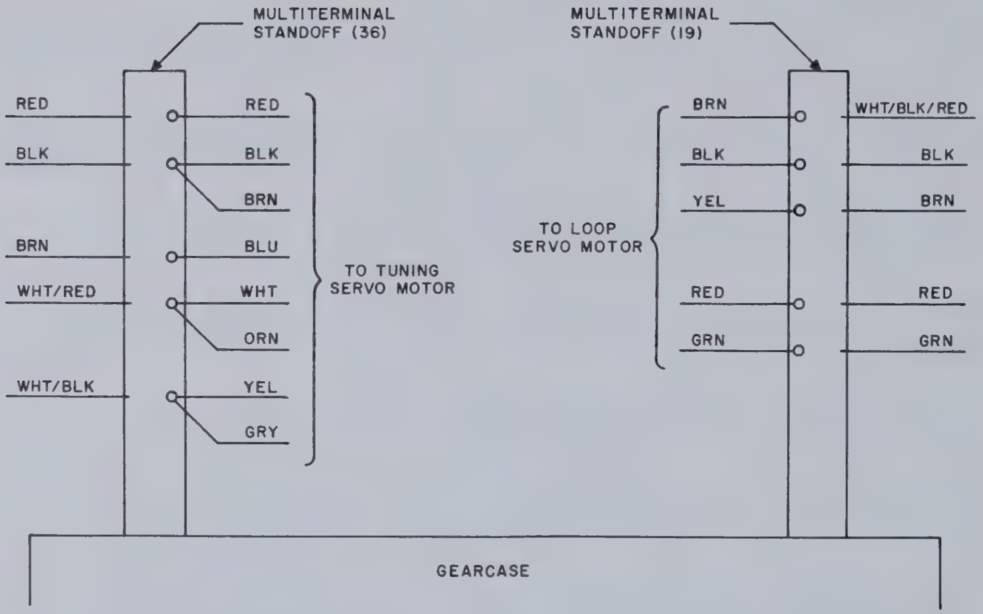
(9) Reconnect leads to multiterminal standoffs on gear case as shown in figure 503.

(10) Reconnect leads to bearing synchro shaft (162) as shown in figure 504.

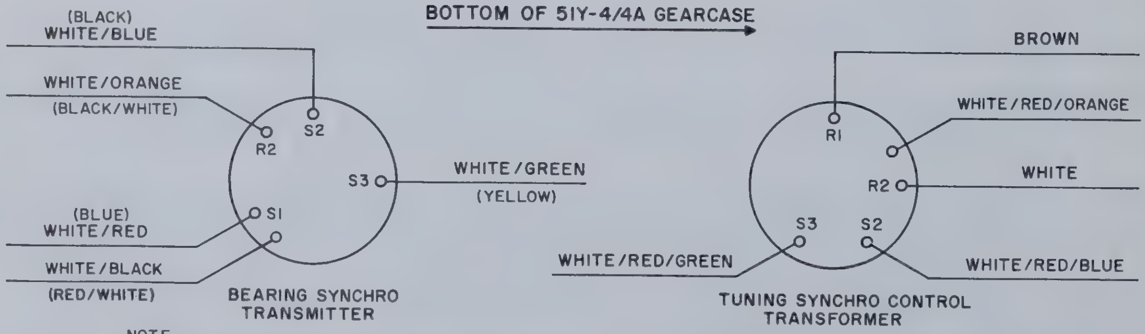
(11) Reconnect leads to loop synchro control transformer (145) as shown in figure 504.

(12) Use two screws (140), two lockwashers (141), two flat washers (142), and two rim clinching clamps (143) to secure switch mounting plate (139) to gear case. The large hole in center of switch mounting plate (139) should be over sleeve bearing (167).

(13) Place switch wafers (14, 13) on switch shaft (106). There is a dimple in shaft slot of each wafer rotor. Both dimples should be on same flat of switch shaft (106).


MULTITERMINAL STANDOFF (36)
MULTITERMINAL STANDOFF (19)
RED
BLK
BRN
WHT/RED
WHT/BLK
RED
BLK
BRN
BLU
WHT
ORN
YEL
GRY
TO TUNING SERVO MOTOR
TO LOOP SERVO MOTOR
BRN
BLK
YEL
RED
GRN
WHT/BLK/RED
BLK
BRN
RED
GRN
GEARCASE

Connections to Servomotor
Figure 503


BOTTOM OF 51Y-4/4A GEARCASE
(BLACK)
WHITE/BLUE
WHITE/ORANGE
(BLACK/WHITE)
S2
R2
S3
WHITE/GREEN
(YELLOW)
(BLUE)
WHITE/RED
S1
WHITE/BLACK
(RED/WHITE)
BEARING SYNCHRO TRANSMITTER
BROWN
R1
WHITE/RED/ORANGE
R2
WHITE
S3
S2
WHITE/RED/GREEN
WHITE/RED/BLUE
TUNING SYNCHRO CONTROL TRANSFORMER

NOTE:
( ) DENOTES WIRE COLORS FOR SYNCHRO USED ON 51Y-4 AND 51Y-4A WITH MCN NUMBERS ABOVE 1355 FOR 51Y-4 AND 749 FOR 51Y-4A. THE NEW SYNCHRO DOES NOT PROVIDE SCREW TERMINALS FOR WIRE CONNECTIONS. WIRES NOT IN ( ), R2, S1, S2, S3 DENOTE SYNCHRO USED ON 51Y-4 AND 51Y-4A WITH MCN NUMBERS BELOW 1355 AND 749 RESPECTIVELY.

Connections to Bearing and Tuning Synchro
Figure 504

(14) Use two screws (15), two insulating washers (16), and four spacers (17, 18) as shown in figure 103 to secure switch wafers (13, 14) to gear case. Mounting holes designated with letter "X" on both switch wafers (13, 14) should be nearest tuning servomotor (149).

(15) Place switch wafer (9) on switch shaft (106). Dimple in shaft slot of wafer rotor should be on same flat as those in step (14).

(16) Use two screws (10), six insulating washers (11), and two spacers (12) as shown in figure 103 to fasten switch wafer (9) to switch plate mounting (139).

(17) Connect red terminal of motor (153) to topmost terminal on rear of switch wafer (9). Connect black terminal to white wire from wiring harness.

D. Installation of BFO.

NOTE: Refer to figure 102 for the location of the BFO.

(1) Reconnect any leads removed from BFO.

(2) Secure BFO to 51Y-4/4A with two screws (8, figure 102) and two lockwashers.

E. Installation of Audio Frequency Subassembly.

NOTE: Refer to figure 102 for the location of the audio frequency subassembly.

(1) Reconnect any leads removed from audio frequency subassembly.

(2) Use five screws (7, figure 102) to secure audio frequency subassembly to 51Y-4/4A chassis. Avoid pinching wires.

F. Installation of IF. Amplifier Subassembly.

NOTE: Refer to figure 101 for the location of the if. amplifier subassembly.

(1) Reconnect any leads removed from if. amplifier subassembly.

(2) Use seven screws (6, figure 101) to secure if. amplifier subassembly to 51Y-4/4A chassis. Avoid pinching wires.

G. Installation of Local Oscillator.

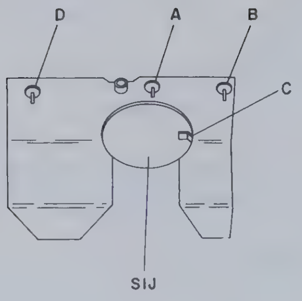
(1) Reconnect any leads removed from local oscillator. Refer to figure 505.

(2) Use four screws (5, figures 101, 102) to secure local oscillator loosely to 51Y-4/4A chassis.

H. Installation of Mixer.

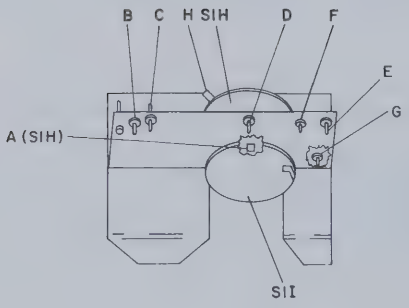
(1) Reconnect any leads removed from mixer. Refer to figure 506.

(2) Use six screws (4, figures 101, 102) to secure mixer loosely to 51Y-4/4A chassis.



TERMINAL	WIRE	ORIGIN OF WIRE
A	WHITE/BLUE	MIXER, TERMINAL D
B	WHITE/BLUE	TUNING CAPACITOR GROUND
C	WHITE/BLUE	FIRST (FROM REAR) TUNING CAPACITOR STATOR
D	WHITE/RED/BLACK	R127

Connections to Local Oscillator Assembly
Figure 505



TERMINAL	WIRE	ORIGIN OF WIRE
A	WHITE/BLACK	SENSE AMPLIFIER TERMINAL A
B	WHITE/BRN/RED	C115 (BEHIND HINGE)
C	WHITE/BLACK	TERMINAL 2 OF T13
D	WHITE/BLUE	RF OSCILLATOR TERMINAL A
E	WHITE/BLUE	TUNING CAPACITOR GROUND
F	WHITE/BLUE	SECOND (FROM REAR) TUNING CAPACITOR STATOR
G	WHITE/BLUE	THIRD (FROM FRONT) TUNING CAPACITOR STATOR
H	WHITE/BROWN	SENSE AMPLIFIER

Connections to Mixer Assembly
Figure 506

I. Installation of Loop Amplifier.

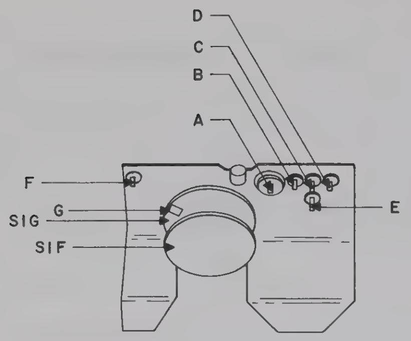
(1) Reconnect any leads removed from loop amplifier. Refer to figure 507.

(2) Use four screws (3, figures 101, 102) to secure loop amplifier loosely to 51Y-4/4A chassis.

J. Installation of Balanced Modulator.

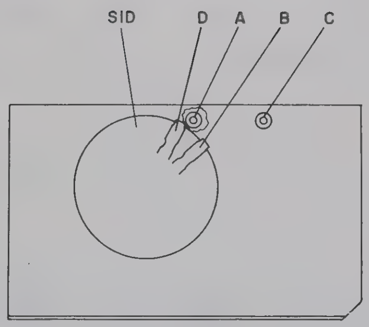
(1) Reconnect any leads removed from balanced modulator. Refer to figure 508.

(2) Use four screws (2, figures 101, 102) to secure balanced modulator loosely to 51Y-4/4A chassis.



TERMINAL	WIRE	ORIGIN OF WIRE
A	WHITE/BLUE	BALANCED MODULATOR TERMINAL A
B	RED	TEFLON COVERED SHIELDED CABLE (MOTOR B3)
C	SHIELD	SHIELD FOR TEFLON COVERED CABLE
D	WHITE	TEFLON COVERED SHIELDED CABLE (MOTOR B3)
E	WHITE/RED/ORN	BALANCED MODULATOR TERMINAL C
F	WHITE/BLUE	TUNING CAPACITOR GROUND
G	WHITE/BLUE	SECOND (FROM FRONT) TUNING CAPACITOR STATOR

Connections to Loop Amplifier Assembly
Figure 507



TERMINAL	WIRE	ORIGIN OF WIRE
A	WHITE / BLUE	LOOP AMPLIFIER, TERMINAL A
B	WHITE	C9
C	WHT/RED/ORN	LOOP AMPLIFIER, TERMINAL E
D	BROWN	C67

Connections to Balanced Modulator Assembly
Figure 508

K. Installation of Sense Amplifier.

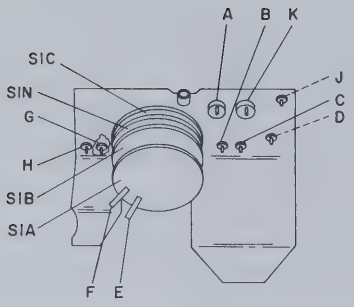
(1) Reconnect any leads removed from sense amplifier. Refer to figure 509.

(2) Use four screws (1, figures 101, 102) to secure sense amplifier loosely to 51Y-4/4A chassis.

L. Installation of Switch Shaft.

(1) Check that all subassemblies containing switch wafers through which switch shaft (12, figure 101) will pass are fastened loosely to 51Y-4/4A chassis.

(2) Remove dust cap on access hole in front panel of 51Y-4/4A.



TERMINAL	WIRE	ORIGIN OF WIRE
A (Q4 COLLECTOR)	WHITE/BLACK, SHIELDED	MIXER, TERMINAL A
B	GREEN	Q15
C	WHT/ORN/GRN	R100
D	GREEN	BALANCED MODULATOR, PRECISION RESISTOR
E	BUS	J1, PIN C
F	BUS	J1, PIN A
G	WHITE/BLUE	FIRST (FROM FRONT) TUNING CAPACITOR STATOR
H	WHITE/BLUE	ROTOR OF ABOVE SECTION
J	YELLOW	R9
K (Q2 COLLECTOR)	WHITE/BROWN, SHIELDED	MIXER, TERMINAL H

Connections to Sense Amplifier Assembly
Figure 509

(3) Insert switch shaft (12, figure 101) through hole in front panel and into slot in rotor of first switch wafer.

(4) The dimples in the slots in switch wafer rotors should all be located on same flat of switch shaft when shaft has been completely inserted. Rotate switch shaft as necessary to accomplish this orientation while inserting switch shaft through each rotor in succession.

(5) After switch shaft has been inserted, fasten rf cover shield on top of rf subassemblies.

(6) Tighten central screws holding rf subassemblies to 51Y-4/4A chassis. The heads of central screws are located in indented area of right side of 51Y-4/4A chassis.

(7) Tighten remaining screws securing rf subassemblies.

(8) Use a torque meter to check that torque required to rotate switch shaft, with coupling to gear case disconnected, does not exceed 36 inch-ounces at approximately 20 rpm. If torque exceeds 36 inch-ounces, repeat steps (4) through (7).

(9) Rotate switch shaft so dimples on switch rotors point toward upper right corner of 51Y-4/4A chassis.

(10) Tighten setscrews engaging switch shaft and switch shaft coupling. One setscrew must bear on flat of switch shaft.

(11) Replace rf cover shield.

(12) Ensure that spring (7) is securely in place over coupling (6). (Refer to figure 103.)

(13) Replace dust cap into hole on front panel of 51Y-4/4A.

M. Securing Rear of 51Y-4/4A Chassis.

NOTE: Do not secure the rear of the 51Y-4/4A chassis if the alignment or testing of the 51Y-4/4A is not complete.

(1) Swing rear of 51Y-4/4A chassis into same place as front of chassis.

(2) Secure rear of 51Y-4/4A chassis with four screws at rear of 51Y-4/4A top and bottom.

N. Installation of Dust Cover.

NOTE: Do not install the dust cover unless the alignment and testing procedures of the following sections have been accomplished, or the 51Y-4/4A is to be stored for some time prior to alignment and testing.

(1) Slide 51Y-4/4A chassis into dust cover.

(2) Tighten captive screw at rear of dust cover.

(3) Tighten clamping screws on each side of 51Y-4/4A immediately behind front panel.

4. LUBRICATION AFTER ASSEMBLY.

Apply gear lubricant, Collins part number 005-0732-00, to large gears in the gear case. Rotate gears by hand to spread lubricant to mating pinions.

The composition of the gear lubricant is given in figure 510.

CAUTION: AFTER THE APPLICATION OF GEAR LUBRICANT, DO NOT PERMIT THE GEAR CASE TO BE EXPOSED TO SETTLING DUST. REPLACE COVER (1), SCREWS (2), AND LOCKWASHERS (3) WHEN ADJUSTMENTS ARE NOT BEING MADE TO GEAR CASE.

Apply switch lubricant, Collins part number 005-0774-00, lightly to all 10 wafer switches in the rf section and the 3 wafer switches on the other side of the gear train. Use either a small touchup brush or a pipe cleaner.

NOTE: Switch lubricant, Collins part number 005-0774-00, consists of 25 percent by weight of Rykon grease no. 2 E.P. and 75 percent by weight of Stanisol solvent (both are Standard Oil Company products).

PARTS BY WEIGHT	COMPONENT
26	Beacon 325 grease
37	Butyl alcohol
37	Xylene

Gear Lubricant Composition
Figure 510

5. INSPECTION AFTER ASSEMBLY.

A. Wiring.

(1) Ensure that wiring harness is not pinched between gearcase and chassis.

(2) Ensure that wires are not broken at switches on rear of gearcase.

(3) Ensure that wires are not exposed to abrasion.

B. Gearcase.

(1) Ensure that all gears in gearcase show evidence of lubrication.

(2) Ensure that no grit or dirt has settled in gearcase after assembly.

C. Tuning Capacitor.

Ensure that plates of tuning capacitor were not bent during assembly.

D. Transistor Placement.

(1) Ensure that correct type of transistors are installed in proper sockets.

(2) Ensure that transistors are oriented properly in sockets.

6. ALIGNMENT.

Abnormal behavior or indications during alignment operations is evidence of faulty circuits in the 51Y-4/4A. Refer to the troubleshooting section of this manual for troubleshooting data relevant to any trouble encountered.

The following procedures require that the test equipment be connected to the 51Y-4/4A as shown in figure 701 or 702 as applicable. A list of test equipment required for the alignment of the 51Y-4/4A is shown in figure 1001.

A. Adjustment of Tuning Servo Hunt Control.

NOTE: If there is a loss of tuning capacitor synchronization before applying power to the 51Y-4/4A, loosen the setscrews that secure the gear to the shaft of the tuning capacitor.

(1) Position 614L-8 mode switch to ANT and frequency to 300 kHz.

(2) Position 477V-2 or 477U-3 POWER switch to ON.

(3) If gearcase cover (1) is in place, remove screws (2) and cover. (Refer to figure 103.)

(4) Loosen locking nut on R111 (refer to figure 808). Rotate R111 fully clockwise.

(5) Rotate 614L-8 TUNE control while observing operation of gear train connected to tuning capacitor.

(6) Rotate R111 counterclockwise until gear train overshoots the new proper position and reverses direction to correct. When this effect is small but noticeable, R111 is correctly adjusted.

(7) Tighten locking nut on R111.

B. Band and Mode Switch Alignment.

(1) Gain access to rear of gearcase as described in paragraph 2.B of disassembly section of manual.

(2) Position 614L-8 mode switch to ANT.

(3) Position 614L-8 band switch to .40-.84.

(4) Position 477V-2 or 477U-3 POWER switch to ON.

(5) Position 614L-8 mode switch to LOOP and back to ANT.

(6) Note position of narrow tabs on switch rotors in front section of 51Y-4/4A chassis. The rotor tabs should be centered about either stator contacts or the space for a stator contact closest to rf cover.

(7) Loosen screws (140), and rotate switch wafer (9) if tabs were not centered in step (6). (Refer to figure 103.)

(8) Repeat steps (5), (6), and (7) until switch tabs are centered.

(9) Tighten screws (140).

C. Synchronization of Tuning Capacitor.

(1) Loosen setscrews (31) on tuning capacitor shaft. (Refer to figure 103.)

NOTE: Fabricate test fixture shown in figure 511.

(2) Connect test fixture and ac vacuum-tube voltmeter between 51Y-4/4A rear power receptacle and power cable from 477V-2 or 477U-3 as shown in figure 511.

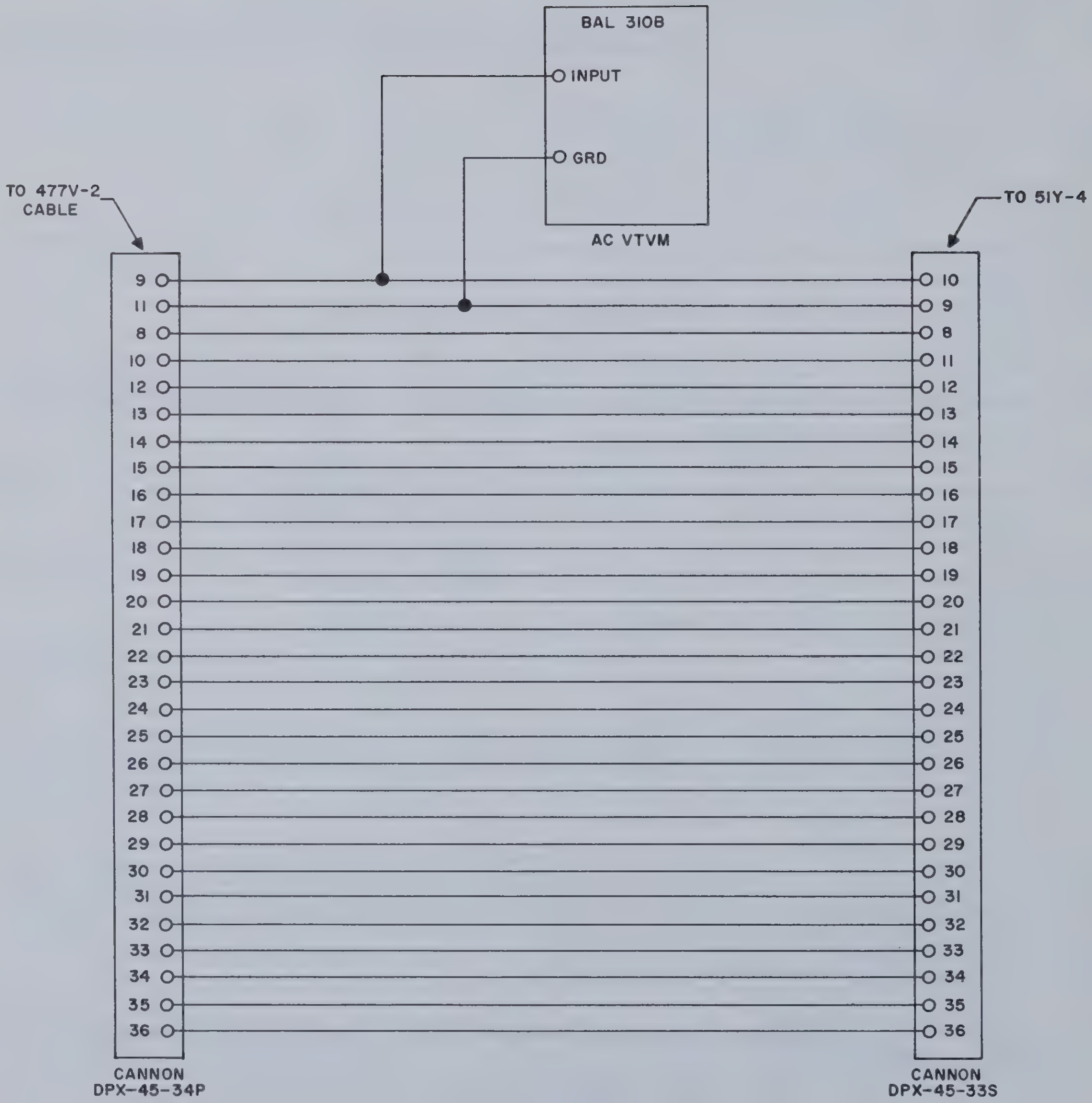
(3) Position 614L-8 band switch to .84-1.75.

(4) Adjust 614L-8 TUNE control so that hairline bisects small circle to right of 1.4-MHz mark on drum dial.

(5) Position 614L-8 mode switch to ANT.

(6) Position 477V-2 or 477U-3 POWER switch to ON.

(7) Slowly adjust 614L-8 TUNE control until ac vacuum-tube voltmeter indicates a null. Hairline of 614L-8 window should still lie within circle on drum dial. If it does not, 614L-8 ADF Control Unit is out of adjustment. Refer to 614L-8 overhaul manual.


BAL 310B
INPUT
GRD
AC VTVM
TO 477V-2 CABLE
TO 51Y-4
9 11 8 10 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
10 9 8 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
CANNON DPX-45-34P
CANNON DPX-45-33S

Tuning Capacitor Synchronization Test Fixture, Schematic Diagram
Figure 511

(8) Adjust shaft of tuning capacitor so that plates of rotor in oscillator section are fully meshed with plates of stator. Plates must be exactly meshed, with tops of stator plates exactly in line with tops of rotor plates.

(9) Tighten setscrews (31) which secure spur gear assembly to tuning capacitor shaft.

CAUTION: AFTER TIGHTENING SETSCREWS (31), DO NOT ROTATE 614L-8 TUNE CONTROL WITH TUNING CAPACITOR SYNCHRONIZATION TEST FIXTURE IN PLACE.

(10) Position 477V-2 or 477U-3 POWER switch to OFF.

(11) Remove capacitor synchronization test fixture from rear of 51Y-4/4A, and reconnect cable from 477V-2 or 477U-3 ADF Test Set.

(12) Slowly rotate tuning control clockwise, and note that capacitor rotor plates rotate out of mesh with stator plates.

D. Alignment of Oscillator.

(1) Position controls of 477V-2 or 477U-3, 614L-8, and internal adjustments of 51Y-4/4A as indicated in figure 512.

(2) Position 477V-2 or 477U-3 POWER switch to ON.

(3) Adjust 614L-8 frequency to 390 kHz.

(4) Adjust signal generator frequency to 390 kc ±0.1 kHz.

(5) Adjust C36 until zero beat is detected in 477V-2 speaker or at 477U-3 PHONE output.

UNIT	CONTROL OR ADJUSTMENT	SETTING
51Y-4/4A	R131 R82 R90	Fully clockwise Fully clockwise Fully clockwise
614L-8	BFO switch Mode switch Band switch	ON ANT .190-.400
477V-2 only	PHONE/SPEAKER/600Ω switch 100 KC SPECTRUM switch	SPEAKER OFF
477V-2 or 477U-3	GONIO DRIVE switch	ON
Signal generator	Modulated 30 percent with 400 Hz	

Initial Control Settings for Alignment of Oscillator
Figure 512

(6) Adjust 614L-8 frequency to 200 kc.

(7) Adjust signal generator frequency to 200 kc ±1.0 kc.

(8) The 614L-8 should now be tuned within 1.5 kc of zero beat. If not, remove cover of band 1 oscillator coil (refer to paragraph 2.K.(1) in the repair section of this manual), and adjust L3 for zero beat at 200 kc. Repeat steps (3) through (8) until zero beat is detected at both 200 and 390 kc.

(9) Temporarily replace L3 cover (do not solder).

(10) Adjust 614L-8 frequency to 800 kc.

(11) Adjust signal generator frequency to 800 kc ±0.1 kc.

(12) Adjust C40 for zero beat.

(13) Adjust 614L-8 to 420 kc.

(14) Adjust signal generator frequency to 420 kc ±0.1 kc.

(15) The 614L-8 should now be tuned within 2.5 kc of zero beat. If it is not, remove cover of band 2 oscillator coil (refer to paragraph 2.K.(1) in the repair section of this manual), and adjust L4 for zero beat at 420 kc; then repeat steps (10) through (15) until zero beat is detected at both 800 kc and 420 kc.

(16) Temporarily replace L4 cover (do not solder).

(17) Adjust 614L-8 to 1700 kc.

(18) Adjust signal generator frequency to 1700 kc ±0.1 kc.

(19) Adjust C44 for zero beat.

(20) Adjust 614L-8 to 900 kc.

(21) Adjust signal generator frequency to 900 kc ±0.1 kc.

(22) The 614L-8 should now be tuned within 5 kc of zero beat. If it is not, remove cover of band 3 oscillator coil (refer to paragraph 2.K.(1) in the repair section of this manual), and adjust L5 for zero beat at 900 kc; then repeat steps (17) through (22) until zero beat is detected at both 900 and 1700 kc.

(23) Replace coil covers and solder in place. (Refer to paragraph 2.K.(2) in the repair section of this manual.)

E. RF Alignment and RF Balance Adjustment.

(1) Position equipment controls as indicated in figure 512; however, for alignment of 51Y-4A, set sense adapter to 270 pf. (Refer to figure 702.)

(2) Position 477V-2 or 477U-3 POWER switch to ON.

(3) Adjust signal generator controls for a signal generator output modulated 30 percent with 400 Hz.

(4) Adjust 614L-8 to 390 kHz.

(5) Tune signal generator to 51Y-4/4A by listening for zero beat in 477V-2 speaker or at 477U-3 PHONE output.

(6) Position 614L-8 BFO switch to OFF.

(7) Adjust signal generator output amplitude and rf gain control for a reading of 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

NOTE: Adjust the receiver GAIN control to approximately three-quarters maximum; then adjust signal generator output to produce 20-mw indication.

(8) Adjust C16, C23, and C26 in succession for a peak indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

(9) The screwdriver slots in capacitors, step (8), should not be parallel to fore-to-aft axis of 51Y-4. If slots lie in this plane, T4, T7, or T10 (T104, T107, or T10 for 51Y-4A) must be readjusted. If transformer must be readjusted, proceed as follows:

(10) Adjust signal generator frequency to 200 kHz.

(11) Position 614L-8 BFO switch to BFO, and adjust 614L-8 until zero beat is detected in 477V-2 speaker or at 477U-3 PHONE output.

(12) Position 614L-8 BFO switch to OFF.

(13) Remove cover of transformer T104, T107, and T10. (Refer to paragraph 2.K.(1) in the repair section of this manual.

   (a) Adjust output of signal generator for an indication of 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

   (b) Adjust transformer T4 (T104 for 51Y-4A) for maximum indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

   (c) Replace cover of T4 (T104 for 51Y-4A). (Refer to paragraph 2.K.(2) in the repair section of this manual.)

(14) Adjust 614L-8 to 800 kHz.

(15) Position 614L-8 BFO switch to BFO, and tune signal generator to 51Y-4/4A by listening for zero beat from 477V-2 speaker or 477U-3 PHONE output.

(16) Adjust output of signal generator for an indication of 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

(17) Adjust C17, C24, and C27 for a peak indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

(18) Repeat steps (9) through (17), but substitute C17, C24, and C27 for C16, C23, and C26; T5, T108, and T11 for T4, T107, and T10 (T105, T108, and T11 for T104, T107, and T10 for 51Y-4A); and 420 kHz for 200 kHz.

(19) Adjust 614L-8 to 1700 kHz.

(20) Position 614L-8 BFO switch to BFO, and tune signal generator to 51Y-4/4A by listening for zero beat from 477V-2 speaker or 477U-3 PHONE output.

(21) Position 614L-8 BFO switch to OFF.

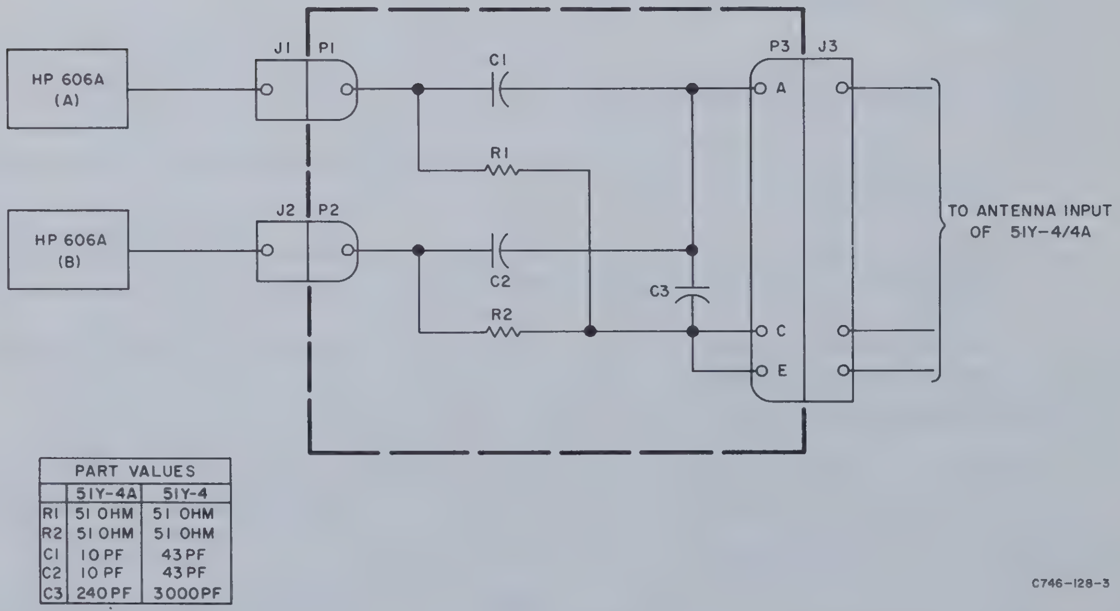
(22) Adjust output of signal generator for an indication of 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

(23) Adjust C18, C25, and C28 for a peak indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

(24) Repeat steps (9) through (17), but substitute C18, C25, and C28 for C16, C23, and C26; T6, T9, and T12 for T4, T7, and T10 (T106, T109, and T12 for T104, T107, and T10 for 51Y-4A); and 900 kHz for 200 kHz.

NOTE: Steps (25) through (32) provide procedures to be used for rf balance adjustment.

(25) Fabricate balance network, and interconnect 51Y-4/4A with signal generators as shown in figure 513.



PART VALUES		
	51Y-4A	51Y-4
R1	51 OHM	51 OHM
R2	51 OHM	51 OHM
C1	10 PF	43 PF
C2	10 PF	43 PF
C3	240 PF	3000 PF

RF Balance Adjustment Test, Interconnection Diagram
Figure 513

(26) Position 614L-8 controls as follows:

(a) BFO to OFF.

(b) Mode to ANT.

(c) Band to 1.

(d) Frequency to 400 kHz.

(27) Adjust signal generator A for zero output.

(28) Adjust signal generator B for a 400-kHz, 30-percent modulated, 100-uv signal, and tune 51Y-4/4A for maximum audio output.

(29) Adjust 614L-8 GAIN control for an output of 20 mw.

(30) Adjust signal generator A for a 960-kHz output, and adjust signal generator B for a 560-kHz output.

NOTE: Do not change the 614L-8 GAIN control. Adjust the output of each signal generator for a 1-volt signal output, and tune signal generator A for maximum audio output.

(31) Adjust signal generator outputs to equal levels to produce a 20-mw audio output of 477V-2.

(32) Adjust R136 (figure 811) to maximum counterclockwise position, then rotate R136 5 turns clockwise. Adjust R136 for minimum audio output. The signal generator levels must be adjusted to maintain audio level between 10 and 20 mw at all times during adjustment.

NOTE: Balance must occur within ±3 turns from this position.

F. Loop Amplifier Adjustment.

(1) Position equipment controls as indicated in figure 512.

(2) Position 477V-2 or 477U-3 POWER switch to ON.

(3) Position 614L-8 mode switch to LOOP.

(4) Rotate LOOP SIMULATOR 90 degrees with respect to BEARING INDICATOR.

(5) Adjust 614L-8 to 390 kHz.

(6) Position 614L-8 BFO switch to BFO.

(7) Tune signal generator to 614L-8 by listening for zero beat from 477V-2 speaker or at 477U-3 PHONE output.

(8) Position 614L-8 BFO switch to OFF.

(9) Adjust output amplitude of signal generator for an indication of approximately 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

(10) Adjust C2 for a peak indication on reading 477V-2 meter or at 477U-3 AUDIO OUT jacks.

(11) Adjust 614L-8 frequency to 200 kHz.

(12) Vary frequency of signal generator in vicinity of 200 kHz, and note peak indication of 477V-2 meter or at 477U-3 AUDIO OUT jacks.

(13) Adjust signal generator to 200 kHz, and note indication of 477V-2 meter or at 477U-3 AUDIO OUT jacks. The indication in this step must be within 1 db of indication noted in preceding step. If difference is more than 1 db, proceed as follows:

  (a) Remove cover of transformer T1. (Refer to paragraph 2.K.(1) in the repair section of this manual.)

  (b) Adjust signal generator to 200 kHz.

  (c) Adjust output amplitude of signal generator for an indication of approximately 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

  (d) Adjust transformer T1 for a peak indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

  (e) Repeat steps (4) through (13) until no further adjustment is required.

  (f) Temporarily replace cover of transformer T1 (do not solder).

(14) Position 614L-8 to 390 kHz.

(15) Position 614L-8 BFO switch to BFO.

(16) Tune signal generator to the 51Y-4/4A by listening for zero beat from 477V-2 speaker or at 477U-3 PHONE output.

(17) Position 614L-8 BFO switch to OFF.

(18) Adjust output amplitude of signal generator for an indication of 20 mw on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

(19) Adjust C2 for a peak indication on 477V-2 meter or at 477U-3 AUDIO OUT jacks.

(20) Check that screwdriver slot of C2 is not parallel to fore-to-aft axis of 51Y-4/4A. Maladjustment of transformer T1 is indicated if C2 screwdriver slot is parallel to axis. Repeat steps (4) through (20).

(21) Repeat steps (1) through (20), but substitute 420 kHz for 200 kHz, 800 kHz for 390 kHz, T2 for T1, and C3 for C2.

(22) Repeat steps (1) through (20), but substitute 900 kHz for 200 kHz, 1700 kHz for 390 kHz, T3 for T1, and C4 for C2.

(23) Replace T1, T2, and T3 covers, and solder in place. (Refer to paragraph 2.K.(2) in the repair section of this manual.)

G. Audio and IF. Amplifier Gain Adjustment.

(1) Audio and if. gain set adjustment.

(2) 614L-8 control positions:

(a) BFO to ON.

(b) Gain to maximum.

(c) Mode to ANT.

(d) Frequency to 200KC

(e) Input signal to 1000 uv/m modulated 30 percent at 400 Hz.

(3) Adjust signal generator to receiver frequency by tuning for zero beat.

(4) Position 614L-8 BFO switch to OFF. Adjust audio gain set control R82 (figure 808) to produce 100-mw audio output. Tighten R82 locknut.

(5) Adjust signal generator output to 40 μV/m, modulated 30 percent at 400 Hz.

(6) Adjust if. gain set control R90 (figure 811) for 80-mw output. Tighten locknut on R90.

H. Bearing Synchro Alignment.

(1) Position 477V-2, 477U-2, or 477U-3 and 614L-8 controls as indicated in figure 514.

(2) Adjust 614L-8 frequency to 390 kHz.

(3) Adjust output of signal generator for approximately 390 kHz, unmodulated, at 1000 uv.

(4) Tune signal generator to 51Y-4/4A by listening for zero beat from 477V-2 speaker or at 477U-3 PHONE output. (Allow 477U-2 or 477U-3 BEARING INDICATOR to stabilize.)

(5) Position 614L-8 BFO switch to OFF.

(6) Note and record indication of 477U-2 or 477U-3 BEARING INDICATOR.

(7) Position 614L-8 mode switch to LOOP.

(8) Use 614L-8 LOOP L-R switch to return 477U-2 or 477U-3 BEARING INDICATOR needle to indication recorded in step (6).

(9) Use 614L-8 LOOP L-R switch to reduce to a minimum tone heard in 477V-2 speaker or at 477U-3 PHONE output. The BEARING INDICATOR should indicate approximately the bearing noted in step (6).

(10) Note position of spur gear assembly (73) with respect to the gearcase. (Refer to figure 103.) Gear position may be marked with a soft crayon.

UNIT	CONTROL OR ADJUSTMENT	POSITION OR SETTING
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	100 KC SPECTRUM switch PHONE/SPEAKER/600 Ω switch METER FUNCTION switch	OFF SPEAKER X10
477U-2	LOOP SIMULATOR control	0 degree
614L-8	GAIN control Function switch BFO switch	Fully clockwise ADF BFO

Control Settings for Synchro Alignment
Figure 514

(11) Position 477V-2 or 477U-3 GONIO DRIVE switch to OFF.

(12) Rotate spur gear assembly (79) as necessary to expose setscrew (80) and loosen setscrews. (Refer to figure 103.)

(13) Rotate spur gear assembly (73) back to position noted in step (10).

(14) Lock shaft of loop servo motor (157). (Refer to figure 103.) Shaft may be locked by a rubber band placed over gear or shaft and stretched to some other part of 51Y-4/4A chassis.

(15) Slide spur gear assembly (79) along synchro (162) shaft until groove in gear (119) is reached. (Refer to figure 103.)

(16) Rotate spur gear assembly (79) and synchro shaft until 477U-2 or 477U-3 BEARING INDICATOR indicates as close to zero degree as possible.

(17) Rotate gear (82), without rotating gear (84), until a right-hand loading of six teeth (after slack takeup) is achieved. (Refer to figure 103.)

(18) Slide spur gear assembly (79) along synchro shaft (162) until spur gear assembly (79) is meshed properly with gear (119). Hold gears (82, 84) so that loading is not lost. (Refer to figure 103.)

(19) Tighten setscrews (80).

(20) Remove rubber band from loop servomotor shaft.

(21) Position 477V-2 or 477U-3 GONIO DRIVE switch to ON.

(22) Loosen four screws to swing away hinged assembly.

(23) Loosen three screws (163) just enough to rotate synchro shaft (162). (Refer to figure 103.)

(24) Use 614L-8 LOOP L-R switch to reposition bearing indicator to null position near zero degree indication on 477U-2 or 477U-3 BEARING INDICATOR. Null position is the point at which 477V-2 meter indicates as close to zero as possible.

(25) Rotate synchro shaft (162) until 477U-2 BEARING INDICATOR indicates zero degree.

(26) Tighten three screws (163).

(27) Replace four screws to secure hinged assembly.

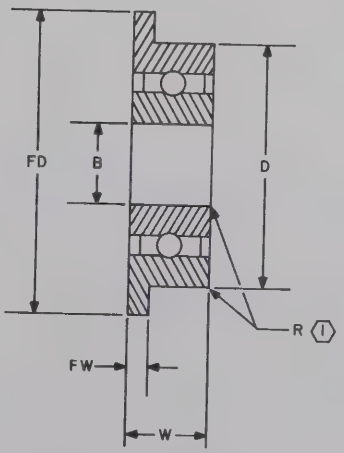
51Y-4/4A ADF Receiver - Fits and Clearances

1. GENERAL.

Included within this section are all fits and clearances for ball bearings located in the front and rear gearplates of the 51Y-4/4A. The index number for each bearing corresponds to the index numbers on figure 103. Items included are permissible wear tolerances, Collins part number, radial play, and dimensions. Refer to figures 601, 602.

INDEX	BORE DIA B	OUTSIDE DIA D	RING WIDTH W	LUBRICATION	FLANGE		RADIUS R	RADIAL PLAY	COLLINS PART NUMBER
					WIDTH FW	DIA FD			
59 through 66, 68, 69, 128, 129, and 131 through 139	0.1250	0.3125	0.1406	MIL-L-6085	0.031	0.359	0.006	0.0001-0.0005	309-1519-00
67 and 130	0.1250	0.2500	0.1094	MIL-L-6085	0.031	0.296	0.005	0.0001-0.0005	309-1518-00

51Y-4/4A Ball Bearing Data
Figure 601



NOTE:
① RADIUS INDICATED IS MAXIMUM SHAFT OR HOUSING FILLET BEARING WILL CLEAR.

51Y-4/4A Shielded Ball Bearing (Typical)
Figure 602

Tolerances for bearings listed in figure 601 are shown in figure 603. Runout indicated for inner ring is radial runout of bore with respect to inner ring ball groove. Runout indicated for outer ring is radial runout of outside diameter with respect to outer ring ball groove.

RING	BORE DIA	OUTSIDE DIA	RING WIDTH	RADIAL RUNOUT	FLANGE DIA	FLANGE WIDTH
INNER	-0.0002		-0.005	0.0002	+0.000	+0.000
OUTER		-0.0003	-0.005	0.0004	-0.005	-0.002

51Y-4/4A Bearing Tolerances
Figure 603

51Y-4/4A ADF Receiver - Testing

1. GENERAL.

Included in this section are procedures for bench testing the 51Y-4/4A ADF Receiver.

Paragraph 4 gives procedures using the 477U-2 ADF Antenna Simulator and the 477V-2 ADF Test Set; paragraph 5 gives procedures using the 477U-3 ADF Test Set.

If the equipment fails to meet the specification of a particular test, refer to the troubleshooting section to locate the faulty stage or component.

2. EQUIPMENT REQUIRED.

Refer to figure 1001 for test equipment required for test.

3. PRELIMINARY PROCEDURES.

For test setup, remove the dust cover from the 51Y-4/4A, and connect the 51Y-4/4A to the test equipment as shown in figure 701 or 702.

4. TEST PROCEDURES. (Using 477U-2 and 477V-2)

A. Antenna Sensitivity.

(1) Position 614L-8 BFO switch to BFO.

(2) Position 614L-8 GAIN control fully clockwise.

(3) Position 614L-8 mode switch to ANT.

(4) Position sense antenna adapter to 270 pf for 51Y-4A.

(5) Position 477V-2 100 KC SPECTRUM switch to OFF.

(6) Position 477V-2 PHONE/SPEAKER/600 Ω switch to SPEAKER. If phones are used, position switch to PHONE.

(7) Position 477V-2 POWER switch to ON.

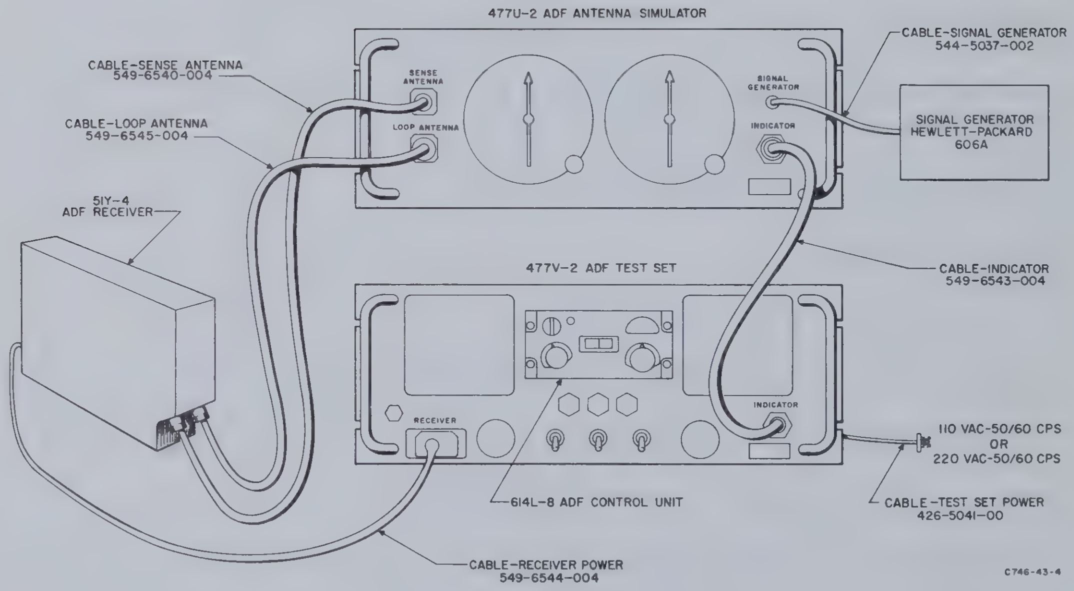
(8) Adjust output of signal generator for a 200-kHz unmodulated signal.

(9) Tune 51Y-4/4A to signal generator by adjusting 614L-8 band switch and TUNE controls to obtain zero beat signal from 477V-2 speaker or phones.

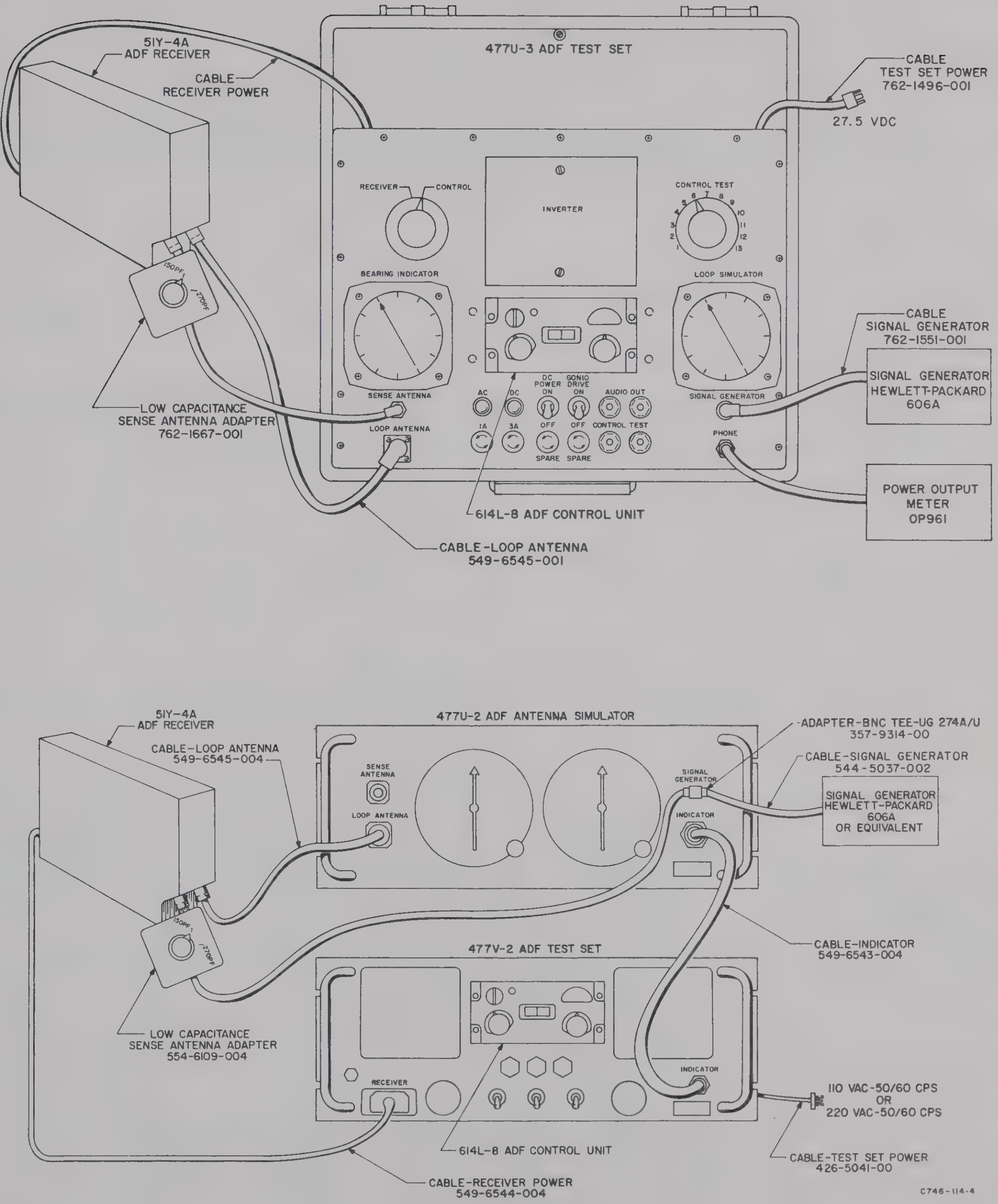
(10) Position 614L-8 BFO switch to OFF. If desired, the 477V-2 PHONE/SPEAKER/600 Ω switch may be positioned to 600 Ω after tuning is accomplished.

(11) Modulate input signal from signal generator 30 percent with 400 Hz.

(12) Adjust signal generator attenuator to maximum signal generator output (uv) level specified in figure 703.


477U-2 ADF ANTENNA SIMULATOR
CABLE-SIGNAL GENERATOR 544-5037-002
CABLE-SENSE ANTENNA 549-6540-004
SENSE ANTENNA
SIGNAL GENERATOR
SIGNAL GENERATOR HEWLETT-PACKARD 606A
CABLE-LOOP ANTENNA 549-6545-004
LOOP ANTENNA
INDICATOR
51Y-4 ADF RECEIVER
477V-2 ADF TEST SET
CABLE-INDICATOR 549-6543-004
INDICATOR
RECEIVER
110 VAC-50/60 CPS OR 220 VAC-50/60 CPS
614L-8 ADF CONTROL UNIT
CABLE-TEST SET POWER 426-5041-00
CABLE-RECEIVER POWER 549-6544-004
C746-43-4

Test Interconnection Diagram with 51Y-4
Figure 701


51Y-4A
ADF RECEIVER
CABLE
RECEIVER POWER
477U-3 ADF TEST SET
CABLE
TEST SET POWER
762-1496-001
27.5 VDC
RECEIVER
CONTROL
INVERTER
CONTROL TEST
1 2 3 4 5 6 7 8 9 10 11 12 13
BEARING INDICATOR
LOOP SIMULATOR
150PF
270PF
CABLE
SIGNAL GENERATOR
762-1551-001
SIGNAL GENERATOR
HEWLETT-PACKARD
606A
LOW CAPACITANCE
SENSE ANTENNA ADAPTER
762-1667-001
SENSE ANTENNA
AC
DC
DC POWER
ON
OFF
GONIO DRIVE
ON
OFF
AUDIO OUT
SIGNAL GENERATOR
LOOP ANTENNA
1A
3A
SPARE
SPARE
CONTROL TEST
PHONE
POWER OUTPUT
METER
OP961
614L-8 ADF CONTROL UNIT
CABLE-LOOP ANTENNA
549-6545-001
51Y-4A
ADF RECEIVER
CABLE-LOOP ANTENNA
549-6545-004
477U-2 ADF ANTENNA SIMULATOR
ADAPTER-BNC TEE-UG 274A/U
357-9314-00
CABLE-SIGNAL GENERATOR
544-5037-002
SENSE ANTENNA
LOOP ANTENNA
SIGNAL GENERATOR
INDICATOR
SIGNAL GENERATOR
HEWLETT-PACKARD
606A
OR EQUIVALENT
150PF
270PF
CABLE-INDICATOR
549-6543-004
477V-2 ADF TEST SET
LOW CAPACITANCE
SENSE ANTENNA ADAPTER
554-6109-004
INDICATOR
RECEIVER
110 VAC-50/60 CPS
OR
220 VAC-50/60 CPS
614L-8 ADF CONTROL UNIT
CABLE-TEST SET POWER
426-5041-00
CABLE-RECEIVER POWER
549-6544-004
C746-114-4

Test Interconnection Diagram with 51Y-4A
Figure 702

(13) Adjust 614L-8 GAIN control for a 20-mw indication on 477V-2 meter.

(14) Remove signal generator modulation.

(15) 477V-2 meter indication should drop at least 6 db.

(16) Repeat steps (1) through (15) of this paragraph for each signal generator frequency shown in figure 703. (For the 51Y-4A, position sense adapter to 150 pf, and repeat steps (1) through (16) for each specified frequency.)

B. Loop Sensitivity.

(1) Position 614L-8 mode switch to LOOP.

(2) Position 477V-2 GONIO DRIVE switch to ON.

(3) Adjust 477U-2 LOOP SIMULATOR control until 477U-2 LOOP SIMULATOR indicates 90 degrees more or less than 477U-2 BEARING INDICATOR.

(4) Repeat steps (1), (2), and (5) through (10) of paragraph 4.A.

(5) Modulate input signal from signal generator 30 percent with 400 Hz at level specified in figure 704.

(6) Repeat steps (13), (14), and (15) of paragraph 4.A.

(7) Repeat steps (1) through (6) of this paragraph for each signal generator frequency shown in figure 704.

SIGNAL GENERATOR FREQUENCY (kHz)	MAXIMUM SIGNAL GENERATOR OUTPUT (uv)		
	51Y-4	51Y-4A	
		270	150
200	30	50	40
390	40	25	20
420	20	35	28
800	35	20	17
900	15	25	22
1700	15	22	18

Antenna Sensitivity
Figure 703

SIGNAL GENERATOR FREQUENCY (kHz)	MAXIMUM SIGNAL GENERATOR OUTPUT (uv)
200	100
390	75
420	80
800	50
900	50
1700	30

Loop Sensitivity
Figure 704

51Y-4/4A ADF RECEIVER

OVERHAUL MANUAL (523-0755938)

TEMPORARY REVISION NO 34-34-1-1

Insert facing 34-34-1, page 705

Subject: Revised test procedures.

This temporary revision is issued to revise the test procedures using the 477U-2 and 477V-2 to include a test for the balanced modulator adjustment.

Before step D, add the following procedures:

CA. Balanced Modulator Adjustment

(1) Position 614L-8 BFO switch to BFO.

(2) Position 614L-8 GAIN control fully clockwise.

(3) Position 614L-8 mode function switch to ADF.

(4) Position sense antenna adapter to 270 pF for 51Y-4A.

(5) Position 614L-8 frequency control to 300 kHz.

(6) Remove any input signal.

(7) Measure speed of rotation of bearing indicator. Results: Less than 360 degrees of rotation in 2 minutes.

(8) If the results of step (7) are out of tolerance, adjust R10 for minimum needle rotation.

C. ADF Sensitivity.

(1) Position 614L-8 mode switch to ADF.

(2) Position 477V-2 GONIO DRIVE switch to ON.

(3) Repeat steps (1), (2), and (5) through (10) of paragraph 4.A.

(4) Modulate input signal from signal generator 30 percent with 400 Hz at level specified in figure 705.

(5) Repeat steps (13), (14), and (15) of paragraph 4.A.

(6) Repeat steps (1) through (5) of this paragraph for each signal generator frequency shown in figure 705.

SIGNAL GENERATOR FREQUENCY (kHz)	MAXIMUM SIGNAL GENERATOR OUTPUT (uv)	
	51Y-4	51Y-4A
200	55	70
390	65	50
420	40	65
800	50	50
900	20	50
1700	20	25

ADF Sensitivity
Figure 705

D. ADF Bearing Threshold.

(1) Adjust signal generator for an output of 1000 uv at 200 kHz unmodulated.

(2) Position 614L-8 mode switch to ADF.

(3) Position 477V-2 GONIO DRIVE switch to ON.

(4) Position 477V-2 POWER switch to ON.

(5) Position 614L-8 BFO switch to BFO.

(6) Position 477V-2 PHONE/SPEAKER/600Ω switch to SPEAKER or PHONE.

(7) Tune 51Y-4/4A to signal generator by adjusting the 614L-8 TUNE and GAIN controls to obtain zero beat from 477V-2 speaker or phones.

(8) Position 614L-8 BFO switch to OFF.

(9) Record indication of 477U-2 BEARING INDICATOR.

NOTE: This indication may be any point between 0 and 360 degrees.

(10) Reduce output of signal generator to 40 uv.

(11) Record indication of 477U-2 BEARING INDICATOR. The value recorded should be the same as that obtained in step (9) ±2 degrees.

NOTE: Due to the presence of noise at the 40-uv input level, the reading of the BEARING INDICATOR will be slightly erratic. The average bearing should be recorded. The maximum fluctuation should be not more than 5 degrees. ADF HUNT CONTROL R131 (refer to figure 810) adjusts the amount of ADF needle activity. When R131 is in the extreme clockwise position, the speed of taking a bearing and the needle activity is maximum. As R131 is turned counterclockwise, the needle activity becomes slower. When R131 is set for approximately the needle hunt desired, the speed of taking a bearing should be checked per paragraph 4.E. If the speed is too slow, the control must be readjusted clockwise.

(12) Check resolution as follows: Manually rotate loop to each side of indicated bearing, and note how much difference there is in indicated bearing when approaching it from either side. The difference should be less than 2 degrees.

CAUTION: PERFORMANCE CAN BE SERIOUSLY DEGRADED BY POSITIONING R131 TOO FAR FROM THE EXTREME CLOCKWISE POSITION.

(13) Position 614L-8 mode switch to LOOP.

(14) Use 614L-8 LOOP switch to rotate 477U-2 BEARING INDICATOR 175 degrees from its present position.

(15) Position 614L-8 mode switch to ADF.

(16) 477U-2 BEARING INDICATOR should rotate back to indication recorded in step (11).

(17) Increase signal generator output to 0.1 volt.

(18) 477U-2 BEARING INDICATOR should indicate within 2 degrees of indication recorded in step (11).

(19) Repeat steps of this paragraph for each signal generator frequency shown in figure 706. The signal generator output, corresponding to that used in step (10), is also shown in figure 706.

E. Hunting and Bearing Speed.

(1) Adjust signal generator for an output of 1000 uv unmodulated at 300 kHz.

(2) Repeat steps (2) through (10) of paragraph 4.D.

(3) Total excursion of 477U-2 BEARING INDICATOR should be not more than 5 degrees.

(4) Position 614L-8 mode switch to LOOP.

SIGNAL GENERATOR FREQUENCY (kHz)	ADF BEARING THRESHOLD (uv)
200	40
390	40
420	35
800	35
900	25
1700	25

ADF Bearing Threshold
Figure 706

(5) Use 614L-8 LOOP L-R switch to rotate 477U-2 BEARING INDICATOR 175 degrees to right or left of its present reading.

(6) Position 614L-8 mode switch to ADF.

(7) No more than 7 seconds should elapse from time 51Y-4/4A switching mechanism stops rotating until 477U-2 resumes previous indication. (See paragraph D, steps (11) and (12).

F. Audio Output Level.

(1) Adjust signal generator for an output of 1000 uv modulated 30 percent with 400 Hz at 300 kHz.

(2) Repeat steps (2) through (8) of paragraph 4.D.

(3) Position 477V-2 PHONE/SPEAKER/ 600Ω to 600Ω.

(4) Position 477V-2 METER FUNCTION switch to AUDIO MW X 10. The 477V-2 meter should indicate not less than 80 mw (100 mw nominal).

G. Frequency Accuracy.

(1) Position 614L-8 BFO switch to BFO.

(2) Position 477V-2 POWER switch to ON.

(3) Position 477V-2 PHONE/SPEAKER/ 600 Ω switch to SPEAKER. PHONE position may be used if phones are connected to 477V-2 PHONE jack.

(4) Position 477V-2 100 KC SPECTRUM switch to ON.

(5) Adjust 614L-8 GAIN control as desired.

(6) Adjust 614L-8 to zero beat at 100-kHz increments from 200 kHz to 1700 kHz as indicated in 614L-8 frequency window. Zero beats should occur within limits shown in figure 707.

BAND	FREQUENCY (kHz)	LIMITS (kHz)
1	200	±1.5
1	300	±1.5
1	400	±1.5
2	400	±2.5
2	500	±2.5
2	600	±2.5
2	700	±2.5
2	800	±2.5
3	900	±5.0
3	1100	±5.0
3	1300	±5.0
3	1500	±5.0
3	1700	±5.0

Frequency Calibration
Figure 707

5. TEST PROCEDURES. (Using 477U-3.) (Refer to figure 702.)

A. Antenna Sensitivity.

(1) Position 614L-8 BFO switch to OFF.

(2) Adjust 614L-8 GAIN control fully clockwise.

(3) Position 614L-8 mode switch to ANT.

(4) Position 477U-3 POWER switch to ON.

(5) Position sense antenna adapter to 270 pf.

(6) Adjust the output of HP-606A for 200-kHz, and the output level to the setting given in figure 703. Set modulation for 30 percent with 400 Hz.

(7) Carefully tune DF-203 to signal generator frequency. This is done by adjusting 614L-8 band switch and TUNE control to obtain maximum audio signal power indication on OP961.

(8) Find a setting of 614L-8 GAIN control and signal generator attenuator so that:

a. OP961 indicates 20 milliwatts with signal generator modulation on.

b. OP961 indicates a drop of 6 db when signal generator modulation is off.

(9) Signal generator rf output should be not more than that shown in figure 703.

(10) Repeat steps (6) through (9) for each signal generator frequency listed in figure 703.

(11) Position sense antenna adapter (used with 51Y-4A only) to 150 pf and repeat steps (6) through (10).

B. Loop Sensitivity.

(1) Position 614L-8 mode switch to LOOP.

(2) Position 477U-3 GONIO DRIVE switch to ON.

(3) Adjust 477U-3 LOOP SIMULATOR control until 477U-3 LOOP SIMULATOR indicates 90 degrees more or less than 477U-3 BEARING INDICATOR.

(4) Adjust the output of HP-606A for 200-kHz, and the output level to the setting given in figure 704. Set modulation for 30 percent with 400 Hz.

(5) Repeat steps (7) and (8) of paragraph A.

(6) Signal generator rf output should be not more than that shown in figure 704.

(7) Repeat steps (4) through (6) for each signal generator frequency listed in figure 704..

51Y-4/4A ADF RECEIVER

OVERHAUL MANUAL (523-0755938)

TEMPORARY REVISION NO 34-34-1-1

Insert facing 34-34-1, page 709

Subject: Revised test procedures.

This temporary revision is issued to revise the test procedures using the 477U-3 to include a test for the balanced modulator adjustment.

Before step D, add the following procedures:

CA. Balanced Modulator Adjustment

(1) Position 614L-8 BFO switch to BFO.

(2) Position 614L-8 GAIN control fully clockwise.

(3) Position 614L-8 mode function switch to ADF.

(4) Position sense antenna adapter to 270 pF for 51Y-4A.

(5) Position 614L-8 frequency control to 300 kHz.

(6) Remove any input signal.

(7) Measure speed of rotation of bearing indicator. Results: Less than 360 degrees of rotation in 2 minutes.

(8) If the results of step (7) are out of tolerance, adjust R10 for minimum needle rotation.

C. ADF Sensitivity.

(1) Position 614L-8 mode switch to ADF.

(2) Position 477U-3 GONIO DRIVE switch to ON.

(3) Adjust the output of HP-606A for 200-kHz, and the output level to the setting given in figure 705. Set modulation for 30 percent with 400 Hz.

(4) Repeat steps (7) and (8) of paragraph A.

(5) Signal generator rf output should be not more than that shown in figure 705.

(6) Repeat steps (3) through (5) for each signal generator frequency listed in figure 705.

D. ADF Bearing Threshold

(1) Adjust HP-606A for an output of 1000 microvolts at 200-kHz unmodulated.

(2) Position 614L-8 mode switch to ADF.

(3) Position 477U-3 GONIO DRIVE switch to ON.

(4) Position 477U-3 POWER switch to ON.

(5) Position 614L-8 BFO switch to OFF.

(6) Tune DF-203 to signal generator frequency by adjusting 614L-8 band switch and TUNE control to obtain maximum audio signal power indication on OP961.

(7) Record indication of 477U-3 BEARING INDICATOR.

(8) Reduce output of signal generator to 40 uv.

(9) Record indication of 477U-3 BEARING INDICATOR. Value recorded should be the same as that obtained in step (7), ±2 degrees.

NOTE: Due to the presence of noise at the low input level, the reading of the 477U-3 BEARING INDICATOR will be slightly erratic. The average bearing should be recorded. The maximum fluctuation should be not more than 5 degrees.

(10) Position 614L-8 mode switch to LOOP.

(11) Use 614L-8 LOOP switch to rotate 477U-3 BEARING INDICATOR 175 degrees from present position.

(12) Position 614L-8 mode switch to ADF.

(13) 477U-3 BEARING INDICATOR should rotate back to indication recorded in step (9).

(14) Increase signal generator output to 0.1 volt.

(15) 477U-3 BEARING INDICATOR should indicate within 2 degrees of bearing recorded in step (9).

(16) Repeat steps of this paragraph for each signal generator frequency shown in figure 706. Signal generator output corresponding to step (8) is also shown in this figure.

E. Hunting and Bearing Speed.

(1) Adjust HP-606A for an output of 1000 microvolts unmodulated at 300 kHz.

(2) Repeat steps (2) through (6) of paragraph (D).

(3) Total excursion of 477U-3 BEARING INDICATOR should be not more than 5 degrees.

(4) Position 614L-8 mode switch to LOOP.

(5) Use 614L-8 LOOP switch to rotate 477U-3 BEARING INDICATOR 175 degrees to right or left of present position.

(6) Position 614L-8 mode switch to ADF and measure time required for 477U-3 BEARING INDICATOR to resume previous position.

(7) Elapsed time measured in step (6) should be not more than 7 seconds.

F. Audio Output Level.

(1) Adjust HP-606A for an output of 1000 microvolts at 200 kHz, modulated 30 percent with 400 Hz.

(2) Tune DF-203 by adjusting for zero beat with 614L-8 BFO switch on; then position BFO switch to OFF.

(3) Adjust 614L-8 GAIN control maximum clockwise.

(4) OP961 should indicate not less than 80 milliwatts (100 mw nominal).

G. Frequency Accuracy

(1) Position 614L-8 BFO switch to BFO.

(2) Adjust HP-606A for an output of 1000 microvolts at 200 kHz unmodulated. Use HP-5532A electronic counter to ensure accurate adjustment of frequency.

(3) Carefully tune DF-203 to signal generator frequency by adjusting 614L-8 band switch and TUNE control to obtain a zero beat.

(4) Read the frequency shown on 614L-8 dial and record the difference from the input frequency.

(5) The difference in frequency recorded will be not more than 1.5 kHz from the input frequency.

(6) Repeat steps (2) through (4) for each signal frequency listed in figure 707.

(7) The differences in frequency recorded in step (6) will be within the limits shown in figure 707.

H. Self-Test Operation (51Y-4A, 522-2587-013 Only).

(1) Remove dust cover from 51Y-4A.

(2) Connect jumper wire from terminal between C128 and R48 to J3-43.

(3) Position 614L-8 BFO/OFF switch to BFO position.

(4) BEARING INDICATOR on 477U-3 should indicate zero.

51Y-4/4A ADF Receiver - Troubleshooting

1. GENERAL.

Included within this section are troubleshooting procedures, troubleshooting charts, control settings, test points, and 51Y-4/4A schematic diagrams with operating voltages.

Procedures in this section can be used to determine, in sequence, the gain of each stage of the 51Y-4/4A. Use the gain measurement procedures to locate the faulty or inoperative stage, then use normal component tests to locate the source of trouble within each stage. Typical dc voltage levels for each stage are shown in figure 813 for the 51Y-4, and figure 814 for the 51Y-4A.

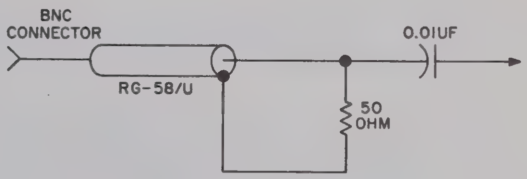
After a difficulty is located and repaired, the equipment should be completely tested to verify that the repairs have not affected other portions of the circuit. Refer to the testing section of this manual.

2. EQUIPMENT REQUIRED.

The test equipment required for troubleshooting the 51Y-4/4A is listed in figure 1001. Figure 801 shows the schematic diagram for the 50-ohm probe used in troubleshooting the 51Y-4/4A.

3. PRELIMINARY PROCEDURES.

For the initial setup remove the dust cover from the 51Y-4/4A and connect the 51Y-4/4A to the test equipment as shown in figure 701 or 702.



50-Ohm Probe, Schematic Diagram
Figure 801

4. GAIN MEASUREMENTS.

A. Gain of IF. Amplifier.

(1) Position test equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 300 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Connect a dc vtvm between ground and cathode of CR1.

(3) Connect agc test point E60 located on if. amplifier subassembly near R90 to ground.

(4) Adjust R90 fully clockwise. (Refer to figure 811.)

(5) Connect signal generator through 50-ohm probe between ground and collector of Q11.

(6) Adjust frequency output of signal generator to 142.5 kHz modulated 30 percent at 400 Hz. Adjust output amplitude as necessary for a 5.0-volt dc indication on dc vtvm.

(7) Output of signal generator should be approximately 2.1 volts. If output of signal generator is abnormally high, check Z1, detector, and noise limiter circuitry.

(8) Connect signal generator to base of Q11.

(9) Repeat step (6). A typical output of signal generator is 0.50 volt. If output of signal generator is abnormally high, check Q11 and associated circuitry.

(10) Connect signal generator to collector of Q10, and repeat step (6). A typical output of signal generator is 3.0 volts. If output of signal generator is abnormally high, check T17.

(11) Connect signal generator to base of Q10, and repeat step (6). If output of signal generator is much more than typical 67-mv reading, replace Q10, and check associated circuitry.

(12) Connect signal generator to collector of Q9 and repeat step (6). If output of signal generator is much more than typical 380-mv reading, check T16.

(13) Connect signal generator to base of Q9, and repeat step (6). Output of signal generator should not be much greater than typical 13.5-mv reading. If it is, third if. amplifier is not operating properly. Replace Q9, and check associated circuitry.

(14) Connect signal generator to collector of Q8, and repeat step (6). If output of signal generator greatly exceeds a typical reading of 76 mv, misalignment of T15 is indicated.

(Figure 801A deleted.)

(15) Connect signal generator to base of Q8, and repeat step (6). Replace Q8 and check associated circuitry if output of signal generator greatly exceeds 270 uv.

(16) Connect signal generator to collector of Q7, and repeat step (6). If output of signal generator greatly exceeds typical 2.5-mv reading, T14 is probably misaligned.

(17) Connect signal generator to base of Q7, and repeat step (6). Replace Q7 if output of signal generator greatly exceeds typical reading of 6.5 uv.

NOTE: Record the output of the signal generator for future reference.

(18) Connect signal generator to collector of Q5. Transformer T13 is probably misaligned if output of signal generator greatly exceeds typical reading of 110 uv.

(19) Refer to paragraph 6.G in assembly section of this manual for alignment instructions needed to reset R90.

B. Operation of Detectors.

(1) Position test equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 300 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Adjust signal generator controls for a signal generator output of approximately 2.8 uv modulated 30 percent with 400 Hz at 142.5 kHz.

(3) Connect signal generator between base of Q9 and ground.

(4) Connect dc vtvm between cathode of CR1 and ground, and connect agc test point E60 to ground. (Agc test point is located on if. amplifier subassembly near R90.)

(5) Adjust output amplitude of signal generator until dc vtvm indicated 0.013 volt.

(6) Connect ac vtvm between cathode of CR1 and ground.

(7) The ac vtvm should indicate approximately 0.8 volt; if not, check components of detector CR1, CR2, and noise limiter circuitry.

(8) 614L-8 tuning meter should indicate approximately three divisions deflection. Full-scale reading of this meter is 100 ua so 3 divisions are equal to 60 ua. If meter indicates improperly, check CR10, C117, and R40.

(9) Connect a dc vtvm between agc test point E60 and ground. Remove jumper used in step (4).

(10) Increase output of signal generator until dc vtvm indicates +2.4 volts dc.

(11) Use dc vtvm to measure potential between cathode of CR1 and ground. If this potential is much greater than typical 4.7 volts, check components of agc amplifier and CR3.

C. Gain of Audio Amplifier.

(1) Position test equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 300 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Connect ac vtvm between cathode of CR1 and ground.

(3) Adjust generator output to 142.5 kHz modulated 30 percent with 400 Hz at 2.8 mv.

(4) Connect signal generator to base of Q9.

(5) Adjust R82 fully clockwise. (Refer to figure 811.)

(6) Adjust output amplitude of signal generator until ac vtvm indicates 0.77 volt ac.

(7) Connect ac vtvm to base of Q12. Typical ac vtvm indication is 42 mv. A voltage much smaller than 42 mv indicates a defective component or connection in noise limiter or Q15 circuitry.

(8) Connect ac vtvm to collector of Q12. Typical ac vtvm indication is 37 mv. Q12 or associated components are defective if indication is much below typical.

(9) Connect ac vtvm to base of Q13. Typical ac vtvm indication is 33 mv. A reading much smaller than 33 mv indicates fault is in output circuitry of Q12.

(10) Connect ac vtvm to collector of Q13. Typical ac vtvm indication is 860 mv. If indication is much less, replace Q13, and check output coupling circuitry.

(11) Connect ac vtvm to collector of Q14. Typical ac vtvm indication is 5.2 volts. A smaller voltage indicates trouble in Q14 or associated components.

(12) Meter on 477V-2 should indicate not less than 280 mv (connect ac vtvm to AUDIO OUT jacks of 477U-3 to measure level). If indication is much less, trouble lies in T20.

(13) After completing troubleshooting and repair, refer to paragraph 6.G in assembly section of this manual for alignment instructions needed to reset R82.

D. Output of Local Oscillator.

(1) Position test equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Short first section of tuning capacitor C1A to ground.

(3) Connect an ac vtvm to E43. Typical indications of ac voltmeter are shown in figure 802 at 614L-8 frequencies shown in same figure.

(4) Remove short on first section of tuning capacitor.

614L-8 FREQUENCY (kHz)	TYPICAL LOCAL OSCILLATOR OUTPUT (volt)
200	0.20
320	0.27
390	0.32
420	0.30
650	0.36
800	0.38
950	0.47
1350	0.50
1750	0.52

Output of Local Oscillator
Figure 802

E. Gain of Mixer Stage at IF. Frequency.

(1) Position test equipment controls as indicated in paragraph 4.D.

(2) Adjust R90 to maximum clockwise position.

(3) Connect signal generator to 50-ohm probe, and connect 50-ohm probe to test point E40 shown in figure 811.

(4) Adjust signal generator frequency to 142.5 kHz.

(5) Position 614L-8 BFO switch to BFO.

(6) Tune signal generator to 51Y-4/4A by listening for zero beat from 477V-2 speaker.

(7) Position 614L-8 BFO switch to OFF.

(8) Connect dc vtvm to cathode of CR1.

(9) Short agc bus to ground.

(10) Note output of signal generator required to produce an indication of 5.0 volts dc on dc vtvm.

(11) A typical ratio of indication recorded in step (17) of paragraph 4.A. to indication recorded in previous step is 1:1.

(12) Repeat steps (1) through (11) for frequencies shown in figure 803. Typical gain at each frequency is also shown.

(13) Remove short on agc bus.

(14) Reset R90. Refer to paragraph 6.G. in assembly section of this manual for alignment instructions needed to reset R90.

614L-8 FREQUENCY (kHz)	TYPICAL GAIN
320	1.200
390	1.200
420	1.050
650	1.000
800	0.985
950	0.775
1350	0.775
1750	0.775

Gain of Mixer at IF. Frequency
Figure 803

F. Gain of Mixer Stage at Receiver Frequency.

(1) Position test equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Adjust R90 to maximum clockwise position.

(3) Connect signal generator to test point E40 through 50-ohm probe (figure 811).

(4) Connect test point E60 to ground.

(5) Adjust 614L-8 to 200 kHz.

(6) Position 614L-8 BFO switch to BFO.

(7) Tune signal generator to 51Y-4/4A by listening for zero beat from 477V-2 speaker.

(8) Position 614L-8 BFO switch to OFF.

(9) Connect dc vtvm to cathode of CR1.

(10) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtvm.

(11) Divide indication recorded in paragraph 4.A.(17) of this section by output of signal generator. A typical ratio is 0.52.

(12) Repeat steps (5) through (11) for frequencies shown in figure 804. Typical ratio for each frequency is also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	0.50
390	0.52
420	0.72
650	0.59
800	0.54
950	0.54
1350	0.50
1750	0.38

Gain of Mixer at Receiver Frequency
Figure 804

G. Gain of RF Amplifier.

(1) Position test equipment controls as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	LOOP BFO Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Short E60, shown in figure 811, to ground.

(3) Connect signal generator to 477U-2.

(4) Adjust output amplitude of signal generator to 100 uv.

(5) Tune 614L-8 to zero beat as detected by 477V-2 speaker.

(6) Position 614L-8 BFO switch to OFF.

(7) Connect dc vtvm to cathode of CR1.

(8) Adjust LOOP SIMULATOR 90 degrees from indicated bearing or maximum meter indication.

(9) Adjust R90 for an indication of 5.0 volts dc on meter connected in step (7).

(10) Connect signal generator to base of Q4 through 50-ohm probe.

(11) Position 614L-8 mode switch to ANT.

(12) Adjust signal generator to 200 kHz.

(13) Position 614L-8 BFO switch to BFO.

(14) Tune 614L-8 to signal generator by listening for zero beat from 477V-2 speaker. Position 614L-8 BFO switch to OFF.

(15) Note output of signal generator required to produce an indication of 5.0 volts on dc vtvm.

(16) Connect signal generator probe to test point E40 (figure 811).

(17) Note signal generator output required to produce an indication of 5.0 volts on dc vtvm.

(18) Divide indication obtained in step (17) by indication obtained in step (15). A typical ratio is 32.

(19) Repeat steps (1) through (18) for frequencies shown in figure 805. Typical ratios for each frequency are also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	67.0
390	50.0
420	54.3
650	40.0
800	28.6
950	46.1
1350	46.7
1750	28.1

Gain of RF Amplifier
Figure 805

H. Gain of Sense Antenna Input Circuitry.

(1) Position test equipment controls as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	LOOP BFO Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Adjust R90 as described in steps (1) through (9) of paragraph 4.G.

(3) Position 614L-8 mode switch to ANT.

(4) Adjust signal generator for maximum deflection of dc vtvm.

(5) Measure output amplitude of signal generator required to produce an indication of 5.0 volts on dc vtvm.

(6) Divide indication recorded in step (15) of preceding paragraph by indication recorded in step (5). Typical ratio is 0.05.

(7) Repeat steps of this paragraph for frequencies shown in figure 806. Approximate ratios for each frequency are also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	0.029
390	0.014
420	0.026
650	0.022
800	0.018
950	0.065
1350	0.034
1750	0.060

Gain of Sense Antenna Input Circuitry
Figure 806

I. Gain of Balanced Modulator.

(1) Position test equipment controls as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	LOOP OFF Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Connect test point E60 to ground, and adjust R90 as described in paragraph 4.G.(1) through (9).

(3) Connect signal generator to base of Q4 through 50-ohm probe.

(4) Adjust frequency output of signal generator for peak indication of dc vtvm.

(5) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtvm. Record signal generator output.

(6) Connect signal generator to base of Q3 through 50-ohm probe.

(7) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtvm.

(8) Divide value recorded in step (5) by output of signal generator required in step (7). A typical ratio is 0.73.

(9) Repeat steps of this paragraph for frequencies shown in figure 807. Typical ratios for each frequency are also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	1.600
390	1.200
420	1.300
650	1.820
800	2.140
950	0.715
1350	0.690
1750	0.875

Gain of Balanced Modulator
Figure 807

J. Gain Measurements of Loop Amplifier and Phase-Shift Network.

(1) Position equipment controls as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	LOOP OFF Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Adjust R90 as described in paragraph 4.G.(1) through (9).

(3) Connect test point E60 to ground.

(4) Connect signal generator to base of Q3 through 50-ohm probe.

(5) Adjust frequency output of signal generator to 200 kHz.

(6) Tune 614L-8 to signal generator as indicated by maximum deflection of dc vtvm.

(7) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtvm. Record output amplitude of signal generator.

(8) Connect signal generator to base of Q1 through 50-ohm probe.

(9) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtvm.

(10) Divide indication recorded in step (7) by present output of the signal generator. A typical ratio is 4.6.

(11) Repeat steps of this paragraph for each frequency shown in figure 808. Typical ratios for each frequency are also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	9.45
390	9.66
420	9.10
650	8.15
800	8.20
950	5.90
1350	5.90
1750	5.15

Gain of Loop Amplifier and
Phase-Shift Network
Figure 808

K. Gain of Loop Antenna Input Circuitry.

(1) Position equipment control as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	LOOP OFF Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Connect test point E60 to ground.

(3) Adjust R90 as described in paragraph 4.G.(1) through (9).

(4) Adjust signal generator frequency to 200 kHz.

(5) Connect dc vtvm to cathode of CR1.

(6) Connect signal generator to base of Q1 through 50-ohm probe.

(7) Tune 614L-8 to signal generator as indicated by maximum delfection of dc vtvm.

(8) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtvm. Record output amplitude of signal generator.

(9) Connect signal generator to 477U-2 or to 477U-3.

(10) Adjust LOOP SIMULATOR to 90 degrees more than indication of BEARING INDICATOR.

(11) Adjust output amplitude of signal generator for an indication of 5.0 volts on dc vtvm.

(12) Divide indication recorded in step (8) by present output amplitude of signal generator. A typical ratio is 0.0082.

(13) Repeat steps of this paragraph for frequencies shown in figure 809. Typical ratios for each frequency are also shown.

FREQUENCY (kHz)	TYPICAL RATIO
320	0.017
390	0.026
420	0.011
650	0.022
800	0.021
950	0.020
1350	0.023
1750	0.032

Gain of Loop Antenna
Input Circuitry
Figure 809

L. Gain of Loop Servo Amplifier and Synchronous Filter.

(1) Position equipment controls as follows:

UNIT	CONTROL OR ADJUSTMENT	SETTING OR POSITION
614L-8	Mode switch BFO switch GAIN control Frequency controls	ANT OFF Fully clockwise 300 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Position 614L-8 BFO switch to BFO.

(3) Connect signal generator to 477U-2 or to 477U-3.

(4) Adjust frequency output of signal generator to 300 kHz.

(5) Tune 614L-8 to signal generator as detected by zero beat from 477V-2 speaker.

(6) Position 614L-8 BFO switch to OFF.

(7) Connect an ac vtvm to emitter of Q16.

(8) Position 614L-8 mode switch to ADF.

(9) Lock shaft of loop servo motor B5 when 477U-2 or 477U-3 BEARING INDICATOR and LOOP SIMULATOR both have same indication. Shaft of loop servo motor is most easily locked with a rubberband stretched between gear on motor shaft and a corner of 51Y-4/4A chassis.

(10) Adjust 477U-2 or 477U-3 LOOP SIMULATOR clockwise as necessary for an indication of 20 mv on ac vtvm.

(11) Adjust R131 to maximum clockwise position.

(12) Measure ac voltages at points shown in figure 810. Typical voltages for each point of measurement are also shown. If voltage at any point is much less than typical voltage shown, check transistor and circuitry associated with points shown in figure 810.

(13) Reset R131 per paragraph 4.D.(11) and (12) in testing section of this manual.

POINT OF MEASUREMENT	TYPICAL VOLTAGE AT POINT OF MEASUREMENT
Q17 base	1.7 mv
Q17 collector	4.0 mv
Q18 base	4.1 mv
Q18 collector	3.0 volts
T18 pin 1	2.9 volts
T18 pin 3	450.0 mv
T18 pin 5	450.0 mv
B5 red	6.0 volts
B5 black	5.6 volts
B5 green	4.1 volts
Q23 collector	4.1 volts
Q23 base	2.0 volts
Q22 collector	2.0 volts

Loop Servo-Voltage Measurements
Figure 810

M. Selected Components.

This paragraph provides the test procedures required to determine the correct value of selected components.

(1) Selection of C151 and C153.

Capacitors C151 and C153 are selected from 47 uf, 56 uf, 68 uf, or 100 uf to obtain a frequency of 110 ±6 Hz from the 110-Hz oscillator. This selection is necessary due to variations in components of the oscillator circuitry.

(a) Position the equipment controls as follows.

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch	ADF OFF
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON OFF
477V-2 only	100 KC SPECTRUM switch	OFF

(b) Refer to figure 811. Unsolder and disconnect one end of C153 from point P or from point Q Select a capacitor combination from the following table. Connect the selected capacitor combination between point P and the positive side of C151.

CAPACITOR COMBINATIONS	TOTAL SERIES CAPACITANCE
47 uf and 47 uf	23.5 uf
47 uf and 56 uf	25.6 uf
47 uf and 68 uf	27.8 uf
56 uf and 56 uf	28.0 uf
56 uf and 68 uf	30.7 uf
47 uf and 100 uf	32.0 uf
68 uf and 68 uf	34.0 uf
56 uf and 100 uf	46.0 uf
68 uf and 100 uf	40.5 uf
100 uf and 100 uf	50.0 uf

(c) Connect frequency counter probe to point V and measure the frequency out of the 110-Hz oscillator. If the frequency is lower than 104 Hz, a capacitor combination with a lower total capacitance will be required. If the frequency is above 116 Hz, a capacitor combination with a higher total capacitance will be required. Several attempts may be necessary to determine which capacitor combination is capable of providing 110 ±6-Hz operation from the 110-Hz oscillator.

(d) Install the selected values of C151 and C153.

(2) Selection of C82.

Capacitor C82 is selected from a value of .16, .34, .50, or .75 uf to obtain a 90-degree phase shift between the 110-Hz oscillator and the loop servo amplifier. This selection is necessary due to variations in the components of the loop servo-amplifier circuitry.

(a) Position the equipment controls as follows.

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch Frequency control	ADF OFF 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON OFF
477V-2 only	100 KC SPECTRUM switch	OFF

(b) Refer to figure 811. Select a value for C82 (.16, .34, .50, or .75 uf). Connect positive lead to point S and negative lead to point R.

(c) Connect signal generator to 477U-2 or 477U-3.

(d) Adjust signal generator for an output of 40 uv at 200 kHz.

(e) Adjust vertical and horizontal sweep of oscilloscope to same amplitude.

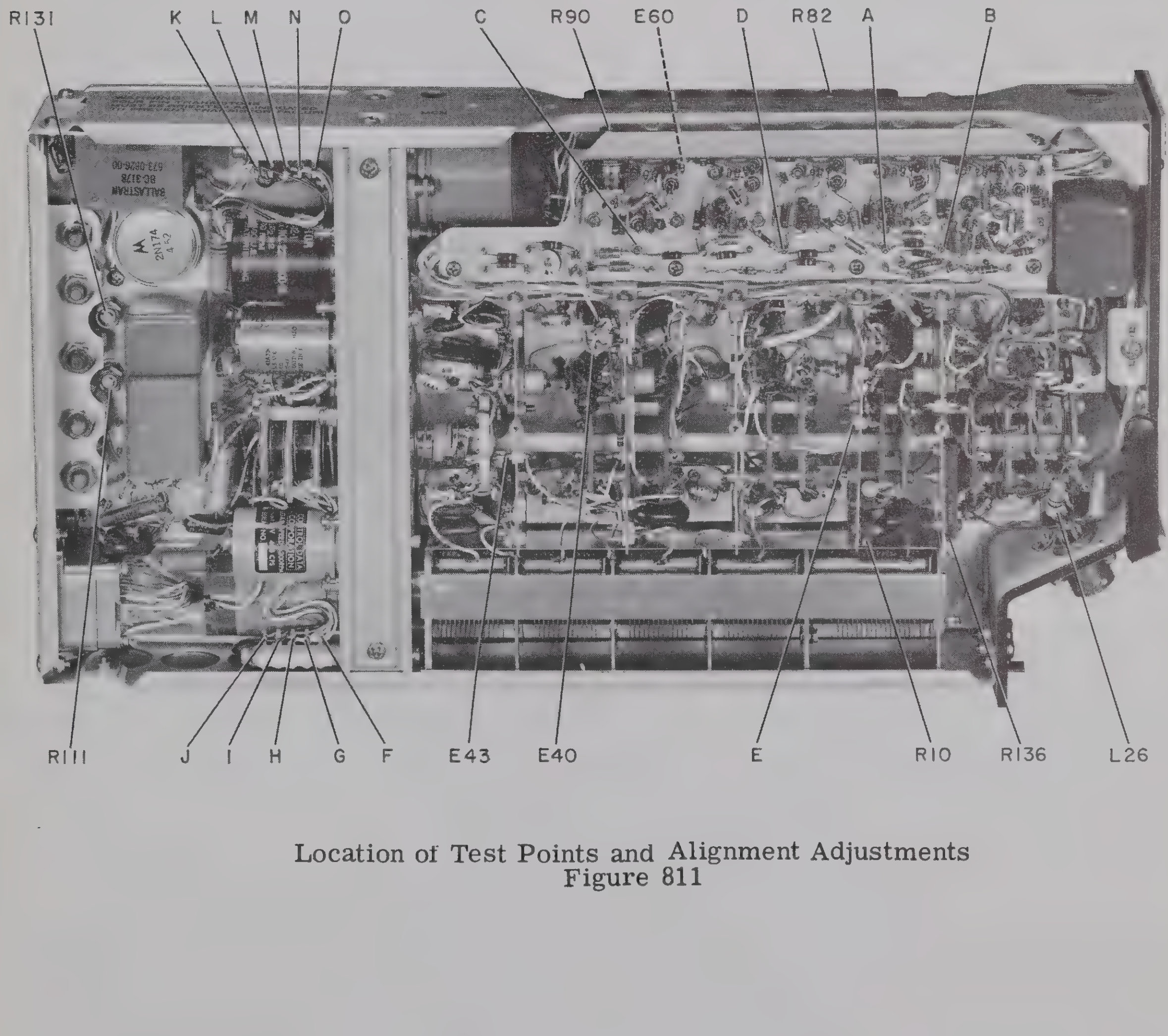
(f) Connect horizontal input of oscilloscope to point V and vertical input to point W. Observe lissajous pattern obtained.

(g) Repeat steps (b) through (f) to select a value of C82 which will provide the best circular lissajous pattern on the oscilloscope.

(h) Install selected value of C83.

(3) Selection of R133.

Resistor R133 is selected from a value of 1500, 1800, 2200, 2700, 3300, or 3900 ohms to obtain proper slow slew speed of loop antenna. This selection is necessary due to variations in the components of the loop servo-amplifier circuitry.


R131
K
L
M
N
O
C
R90
E60
D
R82
A
B
R111
J
I
H
G
F
E43
E40
E
R10
R136
L26

Location of Test Points and Alignment Adjustments
Figure 811

(d) Install the selected values of C151 and C153.

(2) Selection of C82.

Capacitor C82 is selected from a value of .16, .34, .50, or .75 uf to obtain a 90-degree phase shift between the 110-Hz oscillator and the loop servo amplifier. This selection is necessary due to variations in the components of the loop servo-amplifier circuitry.

(a) Position the equipment controls as follows.

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch Frequency control	ADF OFF 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON OFF
477V-2 only	100 KC SPECTRUM switch	OFF

(b) Refer to figure 811. Select a value for C82 (.16, .34, .50, or .75 uf). Connect positive lead to point S and negative lead to point R.

(c) Connect signal generator to 477U-2 or 477U-3.

(d) Adjust signal generator for an output of 40 uv at 200 kHz.

(e) Adjust vertical and horizontal sweep of oscilloscope to same amplitude.

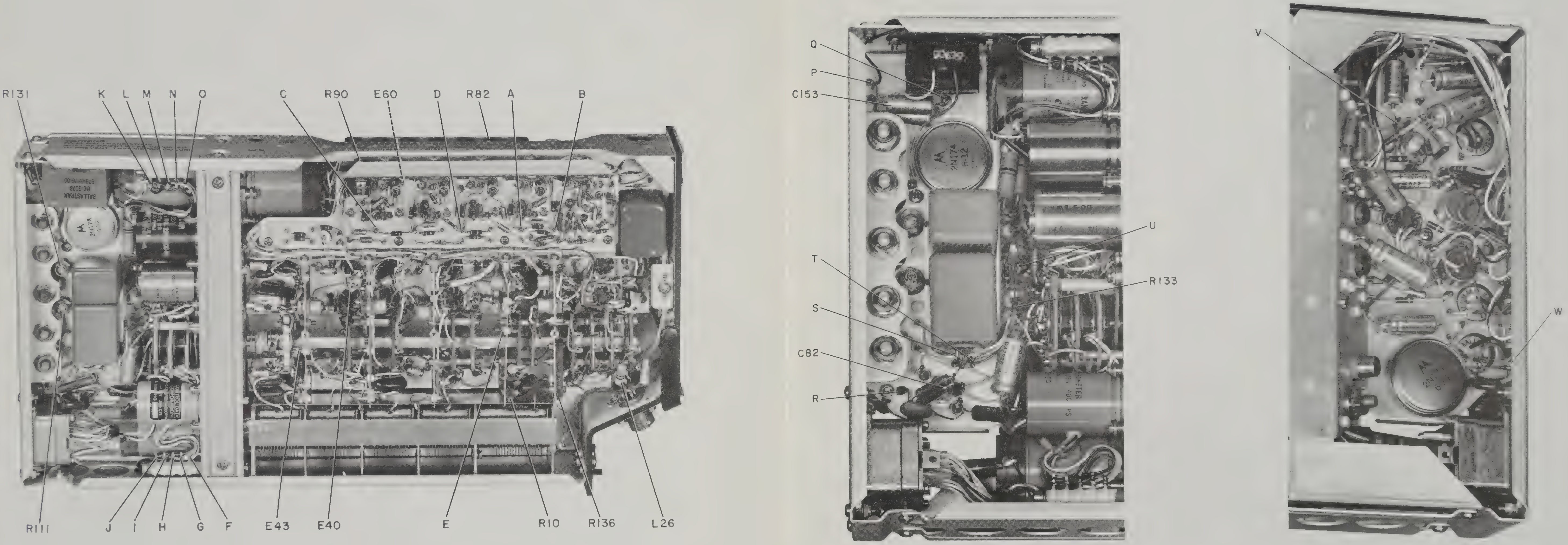
(f) Connect horizontal input of oscilloscope to point V and vertical input to point W. Observe lissajous pattern obtained.

(g) Repeat steps (b) through (f) to select a value of C82 which will provide the best circular lissajous pattern on the oscilloscope.

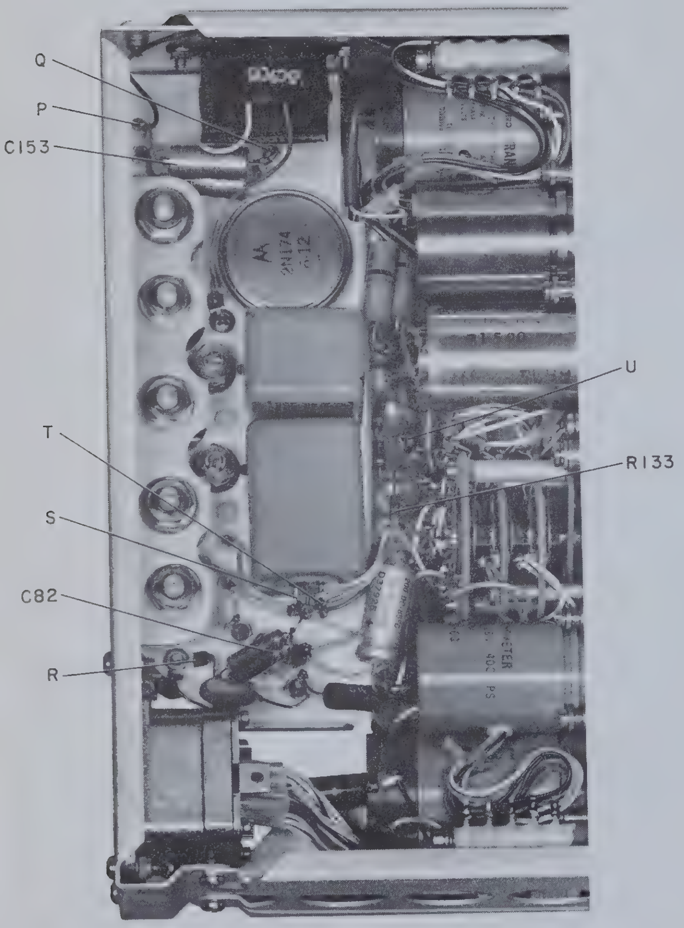
(h) Install selected value of C83.

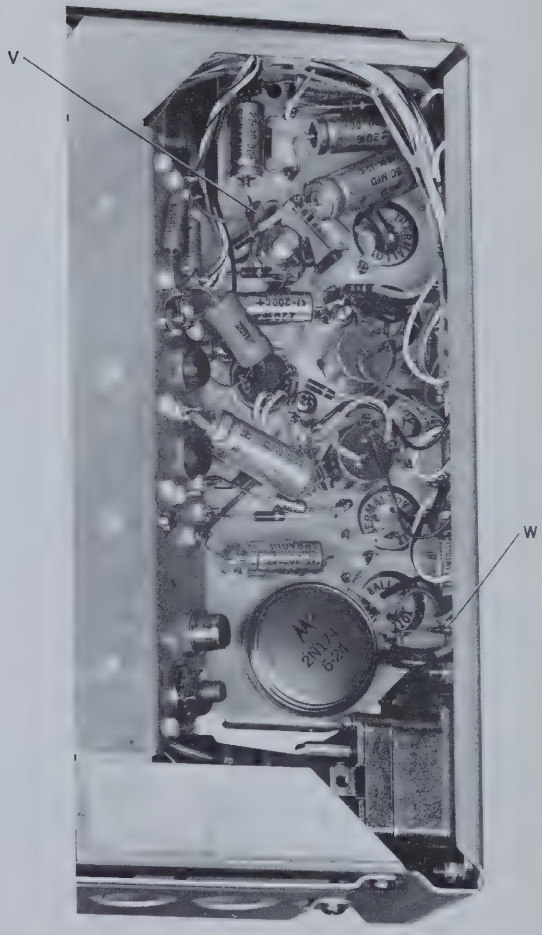
(3) Selection of R133.

Resistor R133 is selected from a value of 1500, 1800, 2200, 2700, 3300, or 3900 ohms to obtain proper slow slew speed of loop antenna. This selection is necessary due to variations in the components of the loop servo-amplifier circuitry.


R131
K
L
M
N
O
C
R90
E60
D
R82
A
B
R111
J
I
H
G
F
E43
E40
E
R10
R136
L26
Q
P
C153
T
S
C82
R
U
R133
V
W

Location of Test Points and Alignment Adjustments
Figure 811


Q
P
C153
T
S
C82
R
U
R133


V
W

(a) Position the equipment control as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8	Mode switch BFO switch	LOOP OFF
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	100 KC SPECTRUM switch	OFF

(b) Refer to figure 811. Select a value for R133 (1500, 1800, 2200, 2700, 3300, or 3900 ohms). Connect one lead to point T and the other lead to point U.

(c) Record indication of 477U-2 Antenna Simulator.

(d) Position 614L-8 LOOP L-R switch to first detent toward R. Record time required for 477U-2 Antenna Simulator to rotate 180 degrees clockwise.

(e) Repeat steps (b) through (d) to select value of R133 which will provide a slow slew speed of 24 to 36 seconds for 180-degree clockwise rotation.

(f) Install selected value of R133.

N. Operation of Self-Test Oscillator. (In 51Y-4A Collins part number 522-2587-013 only.)

(1) Position test equipment controls as follows:

UNIT	CONTROL	SETTING OR POSITION
614L-8 (Collins Part Number 522-2357-024)	Mode switch CW-VOICE-TEST switch GAIN control Frequency controls	LOOP TEST Fully clockwise 200 kHz
477V-2 or 477U-3	POWER switch GONIO DRIVE switch	ON ON
477V-2 only	METER FUNCTION switch 100 KC SPECTRUM switch	X1 or X10 OFF

(2) Connect frequency counter probe at L26 and measure output frequency of self-test oscillator.

(3) If incorrect frequency is obtained, check crystal Y2. If signal is not present; check relay K1, transistor Q33, and transistor Q32 in that order.

(Figure 812 deleted.)

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	A1	Capacitor C77 was 10 uf; is changed to 3 uf.	Lowered time constant to improve filter performance.		MCN 107 and above.
4	A1	Capacitor C76 was 10 uf; is changed to 3 uf.	Lowered time constant to improve filter performance.		MCN 107 and above.
2	A2	Resistor R120 was 330 ohms; is changed to 1200 ohms.	Improved damping of loop servo motor B5.		MCN 107 through MCN 553.
2	A2	Resistor R132 added (6800 ohms).	Improved damping of loop servo motor B5.		MCN 107 through MCN 553.
2	A3	Resistor R133 added.	Added to control slow manual loop rotation speed.		MCN 107 and above.
4	A4	Capacitor C48 was 510 pf; is changed to 10, 000 pf.	Increased if. amplifier gain.		MCN 107 and above.
2	A5	Capacitor C97 was 18 pf; changed to 15 pf.	Improved tracking.		MCN 107 through MCN 1371.
2	A6	Capacitor C82 was 470, 000 pf; is now selected in final test.	Corrected phase shift in tuning servo amplifier.		MCN 209 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1A of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	A7	Capacitor C130 added (10 pf).	Corrected phase shift in loop rf stage.	18 and 20	MCN 209 through MCN 553.
2	A7	Resistor R134 added (15K).		18 and 20	MCN 209 through MCN 553.
2	A8	Capacitor C67 was 68 uf; changed to 47 uf.	Increased reliability.	17	MCN 213 and above.
3	A9	Transistor Q2 is added.	Chanted rf amplifier from single ended to push-pull.		MCN 383 and above.
3	A10	Capacitor C42 was 1200 pf; is changed to 620 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	A10	Capacitor C43 was 51 uf; is changed to 620 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	A10	Capacitor C129 deleted.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	A10	Capacitor C41 was 10 (Cont)	Improved temperature (Cont)		MCN 547 and above

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1B of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3 (Cont)	A10 (Cont)	(Cont) pf; is changed to 15 pf.	(Cont) compensation and tracking of local oscillator.		
3	A10	Capacitor C39 was 120 pf; is changed to 360 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	A10	Capacitor C38 was 620 pf; is changed to 430 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	A10	Capacitor C7 was 150 pf; is changed to 100 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	A10	Capacitor C34 was 270 pf; is changed to 390 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
3	A10	Capacitor C35 was 130 pf; is changed to 10 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 547 and above.
2, 4	A11	Capacitor C125 was 100 uf; is changed to 1.5 uf.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1C of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	A11	Resistor R129 was 220 ohms; is changed to 2700 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Resistor R66 was 10K; is changed to 4700 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Resistor R69 was 680 ohms; is changed to 10K.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Resistor R67 was 68K; is changed to 22K.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Capacitor C79 was 10 uf; is changed to 2.2 uf.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Diode CR12, CR13 deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1D of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	A11	Resistor R130 was 10K; is changed to 1000 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Capacitor C140 added (15 uf).	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 through MCN 580.
2, 4	A11	Capacitor C141 added.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Resistor R139, R140 deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Resistor R122 was 10 ohms; is changed to 15 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Capacitor C99 deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1E of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	(A11)	Resistor R101, R119, R120, R132 deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Capacitor C68 was 40 uf; is changed to 33 uf.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 through MCN 1358
2, 4	(A11)	Diode CR14 deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Resistor R74 was 33 ohms; is changed to 68 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 through MCN 659
2, 4	(A11)	Capacitor C130 was 10 pf; is changed to 680 pf.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	(A11)	Coil L1 was 10,000 uh; is changed to 2000 uh.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1F of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	A11	Resistor R134 was 15K; is changed to 470 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 through MCN 580
2, 4	A11	Coil L6 was 2000 uh; is changed to 1000 uh.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 through MCN 580
2, 4	A11	Resistor R138 added.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2, 4	A11	Resistor R141 added (10K).	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3)	MCN 554 and above.
2	A11	Resistors R76 and R77 were 22 ohms, changed to 15 ohms.	Redistribute gain in loop servo amplifier.		MCN 554 through MCN 1286.
4	A12	Capacitor C140 was 15 uf; is changed to 10 uf.	Increased gain of loop servo amplifier.		MCN 581 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1G of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	A13	Resistor R134 deleted.	Correct level of modulation in balanced modulator.		MCN 581 and above.
2	A13	Coil L6 deleted.	Correct level of modulation in balanced modulator.		MCN 581 and above.
2	A13	Capacitor C142 added.	Correct level of modulation in balanced modulator.		MCN 581 and above.
2	A13	Resistor R143. R144 added.	Correct level of modulation in balanced modulator.		MCN 581 and above
2	A13	Coil L17 was 1000 uh; is changed to 500 uh.	Correct level of modulation in balanced modulator.		MCN 581 and above.
2	A13	Resistor R141 was 10K; is changed to 5600 ohms.	Correct level of modulation in balanced modulator.		MCN 581 and above.
2	A14	Capacitor C95 was 15 pf; is changed to 10 pf.	Adjusted tracking of band 3.		MCN 582 and above.
2, 4	A15	Resistor R87 was 680 ohms; is changed to 1200 ohms.	Changed to silicon transistors for increased (Cont)	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1H of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4			(Cont) reliability, and changed associated components to provide correct voltages for silicon transistors.		
2, 4	(A15)	Resistor R76 was 5.1 ohms; is changed to 15 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 through MCN 1286.
2, 4	(A15)	Resistor R77 was 5.1 ohms; is changed to 15 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 through MCN 1286.
2, 4	(A15)	Capacitor C87 was 200 uf; is changed to 10 uf.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	(A15)	Resistor R88 was 120 ohms; is changed to 4700 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Resistor R79 was 3900 ohms; is changed to 4700 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Thermistor RT4 deleted.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Resistor R49 was 680 ohms; is changed to 1000 ohms.	Changed to silicon transistors for increased reliability (Cont)	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1J of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4 (Cont)			(Cont) and changed associated components to provide correct voltages for silicon transistors.		
2, 4	A15	Resistor R125 was 270 ohms; is changed to 150 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 through MCN 1358.
2, 4	A15	Resistor R124 was 820 ohms; is changed to 1500 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	A15	Resistor R74 was 68 ohms; is changed to 330 ohms.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct (Cont)	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1K of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4 (Cont)			(Cont) voltages for silicon transistors.		
2, 4	(A15)	Resistors R75 was 2200 ohms; is changed to 5600 ohms. ated components	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Transistor Q14 was 2N158A; is changed to 2N2270.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	(A15)	Transistor Q24 was 2N158A; is changed to 2N2405.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1L of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4	A15	Transistor Q25 was 2N158A; is changed to 2N2405.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	A15	Transistor Q28 was 2N158A; is changed to 2N2405.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	A15	Transistor Q29 was 2N158A; is changed to 2N2405.	Changed to silicon transistors for increased reliability, and changed associated components to provide correct voltages for silicon transistors.	27	MCN 660 and above.
2, 4	A15	Transistor Q22 was 2N158A; is changed to 2N1131.	Changed to silicon transistors for increased (Cont)	27	MCN 660 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1M of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2, 4			(Cont) reliability, and changed associated components to provide correct voltages for silicon transistors.		
2, 4	A16	Capacitor C139 added.	Corrected phase shift in loop amplifier.	7	MCN 672 and above.
2, 4	B1	Capacitor C122: 0.1 uf is changed to 0.11 uf.	Increased reliability.	21	MCN 571 and above.
2, 4	B2	Capacitor C52: 1 uf is changed to 0.01 uf.	Offset increased if. gain caused by improved transistors.	23	MCN 687 and above.
4	B2	Capacitor C110: 520 pf is changed to 0.01 uf.	Offset increased if. gain caused by improved transistors.	23	MCN 687 and above.
4	B2	Capacitor C108: 0.1 uf is changed to 0.01 uf.	Offset increased if. gain caused by improved transistors.	23	MCN 687 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1N of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	B3	Coil L7 27 uh is changed to 39 uh.	Improved image rejection.		MCN 847 and above.
3	B3	Coil L8 5.6 uf is changed to 10 uh.	Improved image rejection.		MCN 847 and above.
3	B3	Transformer T10 terminal 4 is changed to terminal 5.	Improved image rejection.		MCN 847 and above.
3	B3	Capacitor C93, 10 pf is changed to 15 pf.	Improved image rejection.		MCN 847 and above.
4	B4	Capacitor C140: 10 uf is changed to 2.2 uf.	Increased servo-amplifier gain.		MCN 847 through MCN 1286.
3	B5	Capacitor C123: 1 uf is changed to C146 4 uf.	Reduced 400-Hz hum in audio output.	25	MCN 851 and above.
4	B5	Capacitor C147 added.	Reduced 400-Hz hum in audio output.	25	MCN 851 and above.
4	B5	Capacitor C83: 10 uf is changed to 0.1 uf.	Reduced 400-Hz hum in audio output.	25	MCN 851 and above.
3	B5	Capacitor C13: 10 uf is changed to C113 and relocated.	Reduced 400-Hz hum in audio output.	25	MCN 851 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 10 of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	B6	Capacitor C148 added.	Removed parasitic in loop servo amplifier.		MCN 942 and above.
2	B7	Capacitor C149 added.	Improved ADF aural sensitivity.		MCN 942 and above.
2	B7	Resistor R6 220 ohms is changed to 1000 ohms.	Improved ADF aural sensitivity.		MCN 942 and above.
4	B8	Resistor R145 added.	Improved matching between agc amplifier and synchronous filter.		MCN 1113 and above.
3	B9	Capacitor C137 added.	Correct drawing.		All.
3	B9	Capacitor C46 added.	Correct drawing.		All.
4	B10	All revision information added to the schematic diagram.	This information aids users in correcting the 51Y-4 schematic to reflect both manufacturing and field revisions. This information was transferred from the (Cont)		MCN 107 to MCN 1113.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1P of 4)
Figure 813

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4 (Cont)	ⓑ10 B10 (Cont)		(Cont) cover letter to the schematic for user's convenience.		
4	B11	Resistor R80, 560 ohms, is changed to 820 ohms.	Increase audio gain.		MCN 669 and above.
2	B12	Capacitor C144, 47 pf is changed to 82 pf.	Adjust level of modulation in balanced modulator.		MCN 581 through MCN 631.
2	B13	Capacitor C144, 82 pf is changed to 47 pf.	Adjust level of modulation in balanced modulator.		MCN 632 and above.
3	B14	Capacitor C145 added.	Reduce 400-Hz hum in audio output.		MCN 838 through MCN 851.
3	B15	Capacitors C145 and C123 deleted.	Capacitors C145 and C123 replaced by capacitor C146.		MCN 851 and above.
3	B16	Capacitor C133, 0.01 uf is changed to 0.011 uf.	Increased reliability.		MCN 939 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1Q of 4)
Figure 813

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY
2	(C1)	Changed Resolver B3 and revised B3 symbol to clarify drawing.		MCN 1172 and above.
2	(C2)	C97 was 15 pf; C98 was 18 pf; changed C97 and C98 to 20 pf for product improvement.		MCN 1372 and above.
2, 3, 4	(C3)	Added polarities to C5, C6, C73, C118, C46, C49, and C109. Added ground connections to Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, and Q21. Changed shielded wire symbols, and note 3 reference. Added gear train symbol to B5. Corrected drawing errors as follows; R97 was shown as 2.7K, R129 was referenced R67; CR4 and CR11 symbol change; C137 was not connected to wire from S1N-7. Renumbered terminals on T10; 1 was 2, 2 was 1, 3 was 5 and 5 was 3. R7 was 311, changed to 316.		All.
2, 3	(C4)	C2, C3, C4, C16, C17, C18, C23, C24, C25, C26, C27, C28, C36, C40 and C44 were 1.3 pf-13 pf, changed to 1.98 pf-12.40 pf to correct drawing error.		All.
2	(C5)	Deleted Z2, and added L32, C151, and C153 for product improvement. R125 was 150 ohms, changed to 68 ohms to provide correct voltage for silicon transistor.		MCN 1359 and above. MCN 1359 and above.
2	(C6)	Added lead color designation to B4, and changed B4 type for product improvement.		MCN 1355 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1R of 4)
Figure 813

51Y-4 ONLY

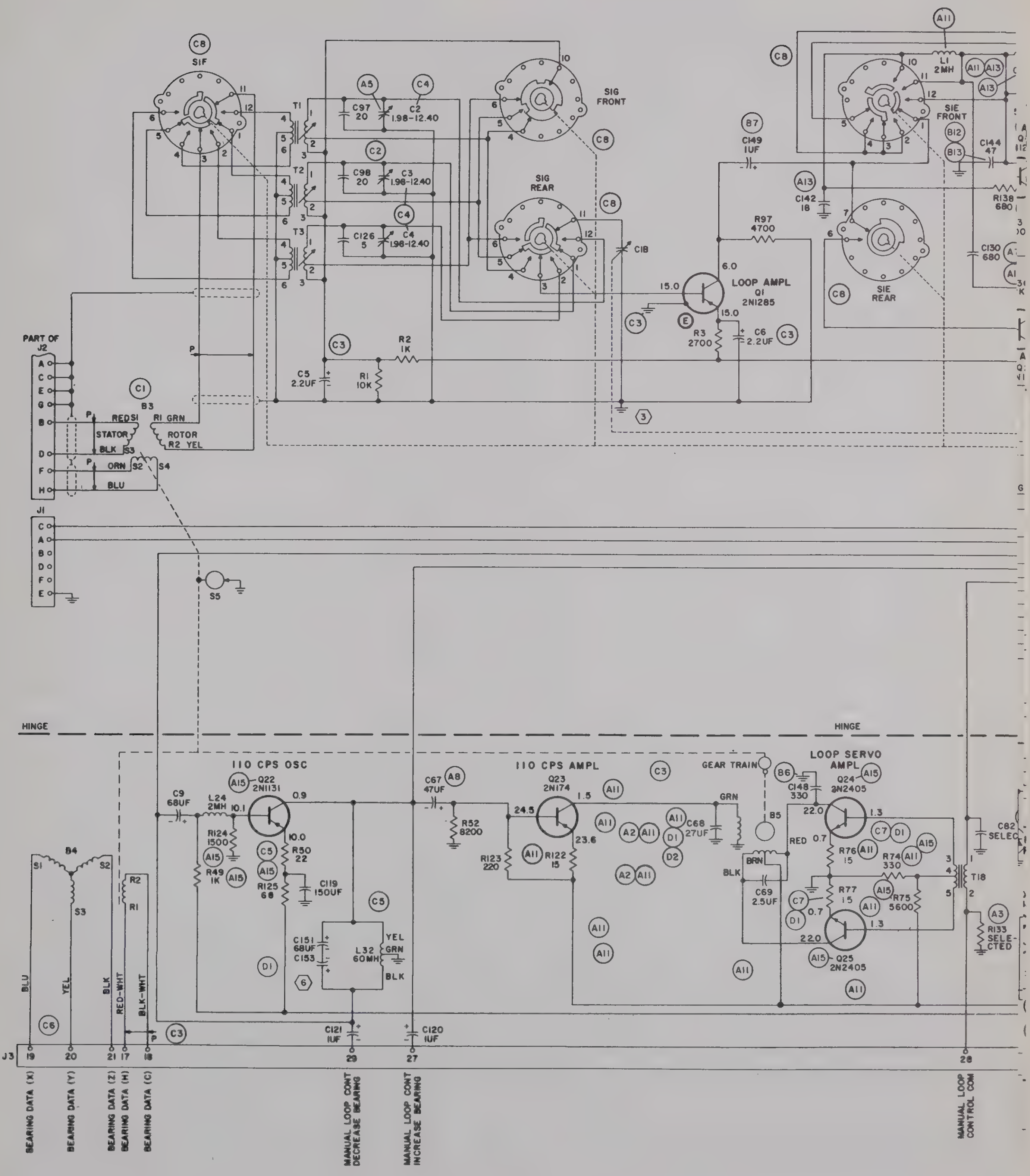
SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY
2	C7	R76 and R77 were 15 ohm, changed to 22 ohm to redistribute gain in loop servo amplifier.		MCN 1287 through MCN 1359.
2, 3	C8	Added numbers to all rotary switch contacts to clarify drawing.		All.
2	C9	Added C150, 330 uf to Q28 collector to eliminate oscillations in tuning servo.		MCN 1160 and above.
3	C10	Q31 was 2N341, changed to 2N2405 for product improvement.		MCN 1292 and above.
3	C11	C35 was 10 pf, changed to 2 pf to improve tracking.		
3	C12	Deleted L7, 39 mh and added C152, 3900 pf to improve image rejection.		MCN 1290 and above.
4	C13	C76 and C77 were 3 uf, changed to 3.3 uf for product improvement.		MCN 1247 and above.
4	C14	C140 was 2.2 uf, changed to .47 uf to redistribute gain in loop servo amplifier.		MCN 1287 through MCN 1358.
3	C15	C133 was 0.011 uf, changed to 0.01 uf for product improvement.		MCN 1292 and above.
2	D1	C153 was 47 uf, now selected in final manufacturing test from 47 uf or 68 uf to compensate for component variation in 110-Hz oscillator circuitry.		MCN 1359 and above.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1S of 4)
Figure 813

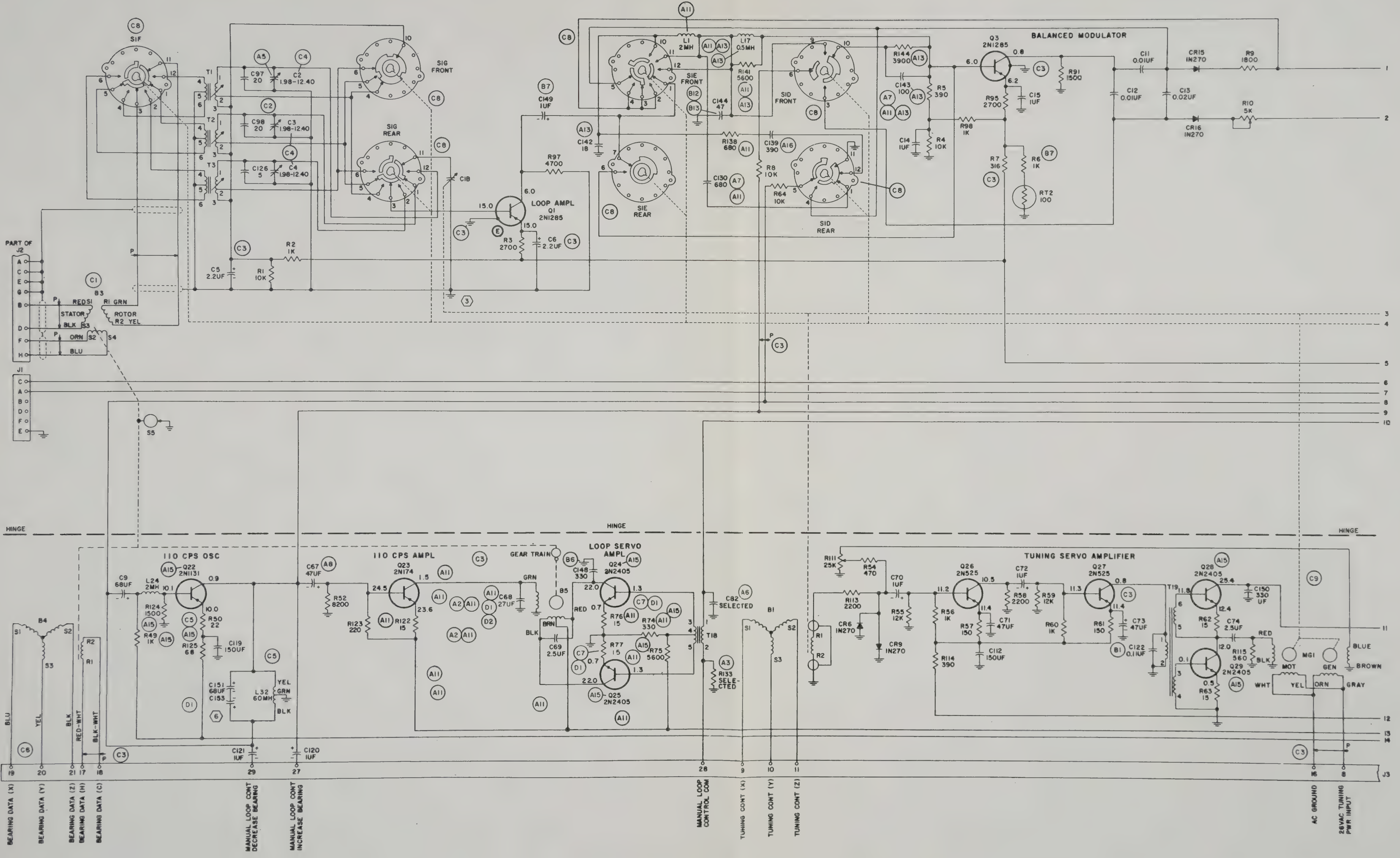
51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY
2	Ⓓ1	R76 and R77 were 22 ohms, changed to 15 ohms to improve loop phasing.		MCN 1359 and above.
4	Ⓓ1	C140 was .47 uf, changed to 2.2 uf to improve loop phasing.		MCN 1359 and above.
2	Ⓓ1	C68 was 33 uf, changed to 22 uf to improve loop phasing.		MCN 554 through MCN 1358.
2	Ⓓ2	C68 was 22 uf, changed to 27 uf to improve bearing speed.		MCN 1359 and above.

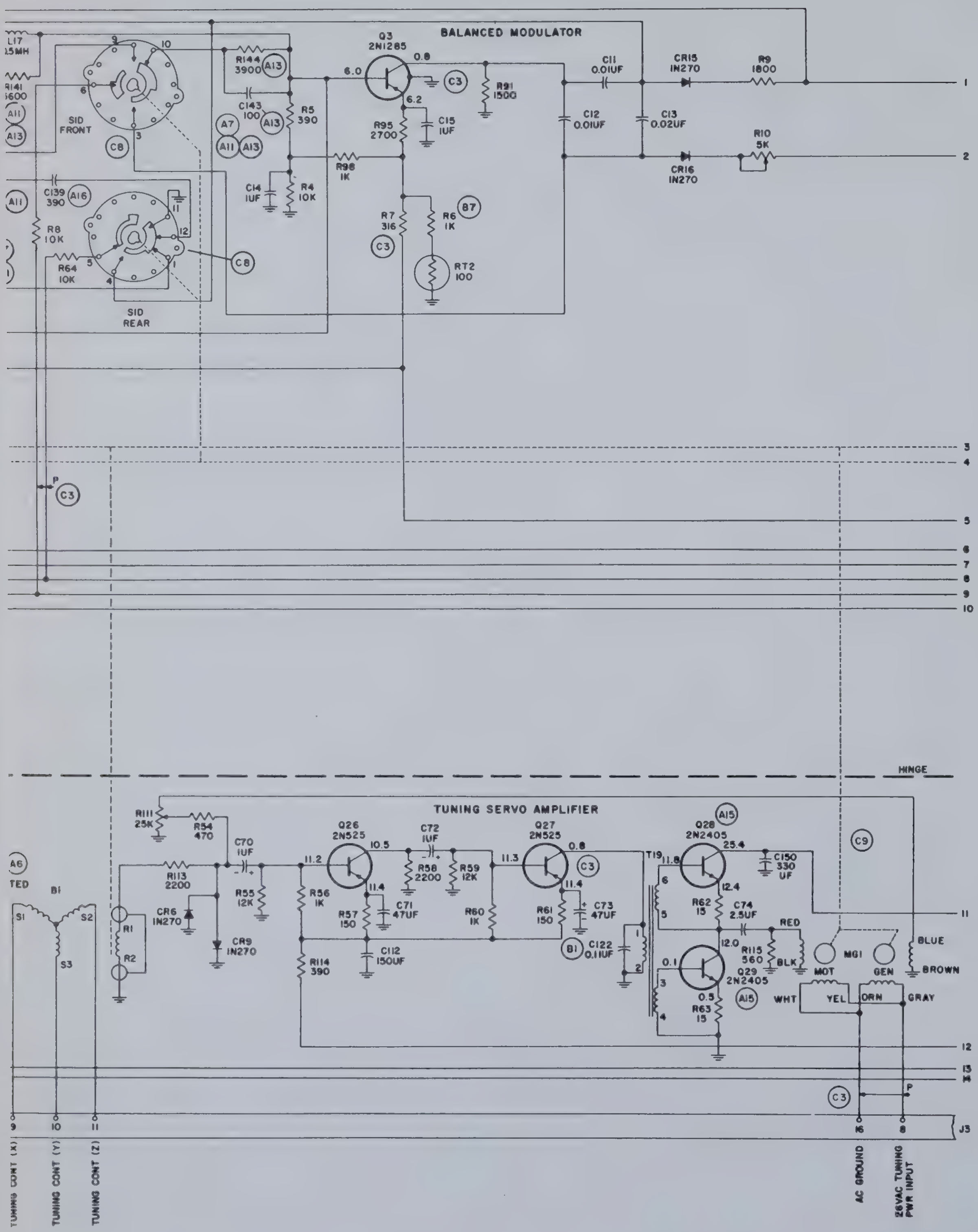
▮ 51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 1T of 4)
Figure 813

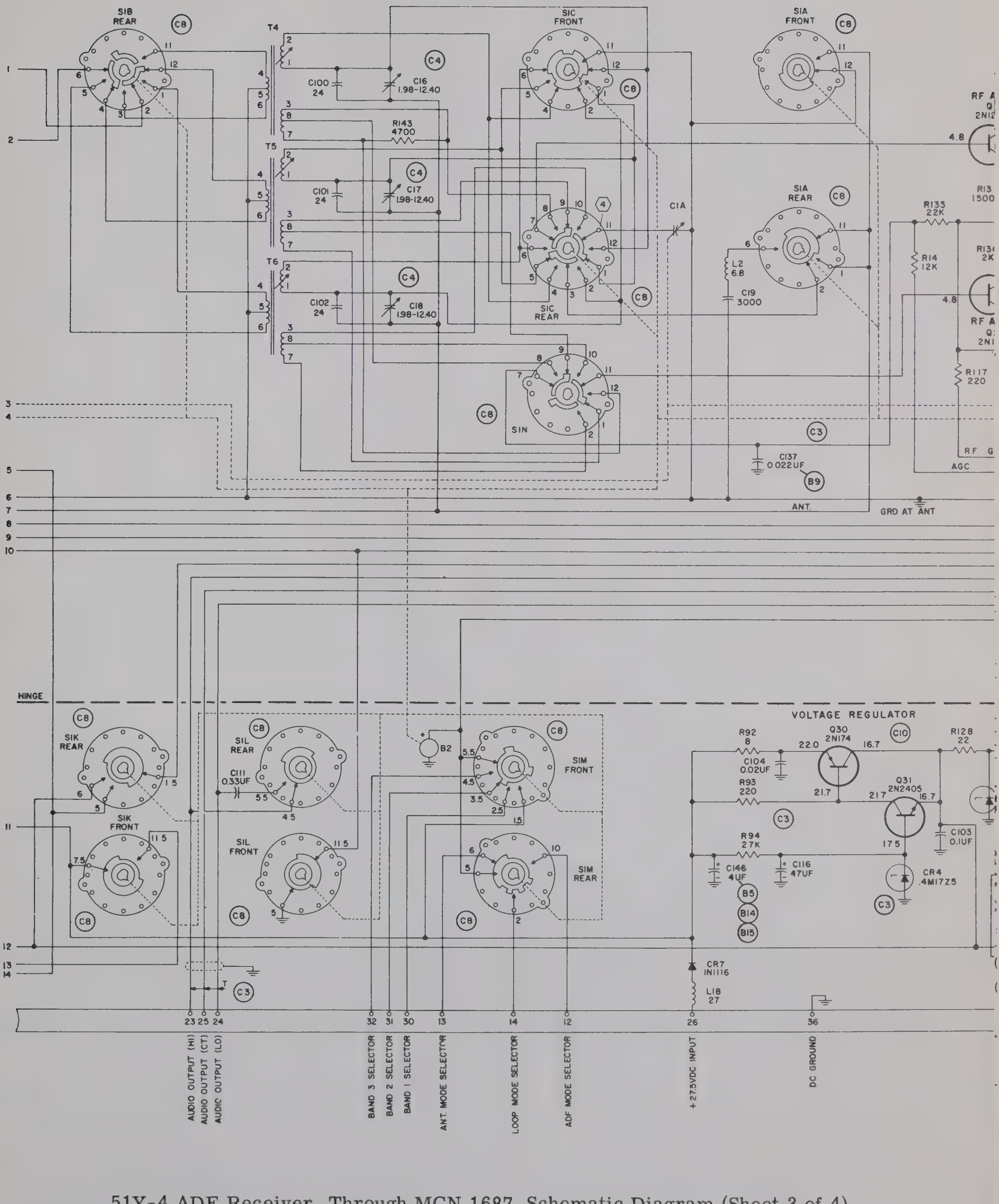

S1F
SIG FRONT
SIG REAR
SIE FRONT
SIE REAR
T1
T2
T3
C97 20
C2 1.98-12.40
C98 20
C3 1.98-12.40
C126 5
C4 1.98-12.40
C18
C149 1UF
R97 4700
LOOP AMPL Q1 2N1285
R3 2700
C6 2.2UF
C5 2.2UF
R1 10K
R2 1K
L1 2MH
C142 18
C144 47
R138 680
C130 680
PART OF J2
B3
STATOR
ROTOR
RED S1
R1 GRN
BLK S3
R2 YEL
ORN S2
S4
BLU
J1
S5
HINGE
110 CPS OSC
Q22 2N1131
C9 68UF
L24 2MH
R124 1500
R49 1K
R50 22
R125 68
C119 150UF
C151 68UF
C153
L32 60MH
YEL
GRN
BLK
C121 1UF
C120 1UF
C67 47UF
R52 8200
110 CPS AMPL
Q23 2N174
R123 220
R122 15
C68 27UF
GRN
GEAR TRAIN
B5
B6
LOOP SERVO AMPL
Q24 2N2405
C148 330
RED
BLK
BRN
C69 2.5UF
R76 15
R77 15
R74 330
R75 5600
Q25 2N2405
T18
C82 SELEC
R133 SELECTED
B4
S1
S2
S3
R2
R1
BLU
YEL
BLK
RED-WHT
BLK-WHT
J3
19
20
21
17
18
29
27
28
BEARING DATA (X)
BEARING DATA (Y)
BEARING DATA (Z)
BEARING DATA (H)
BEARING DATA (C)
MANUAL LOOP CONT DECREASE BEARING
MANUAL LOOP CONT INCREASE BEARING
MANUAL LOOP CONTROL COM

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 2 of 4)
Figure 813

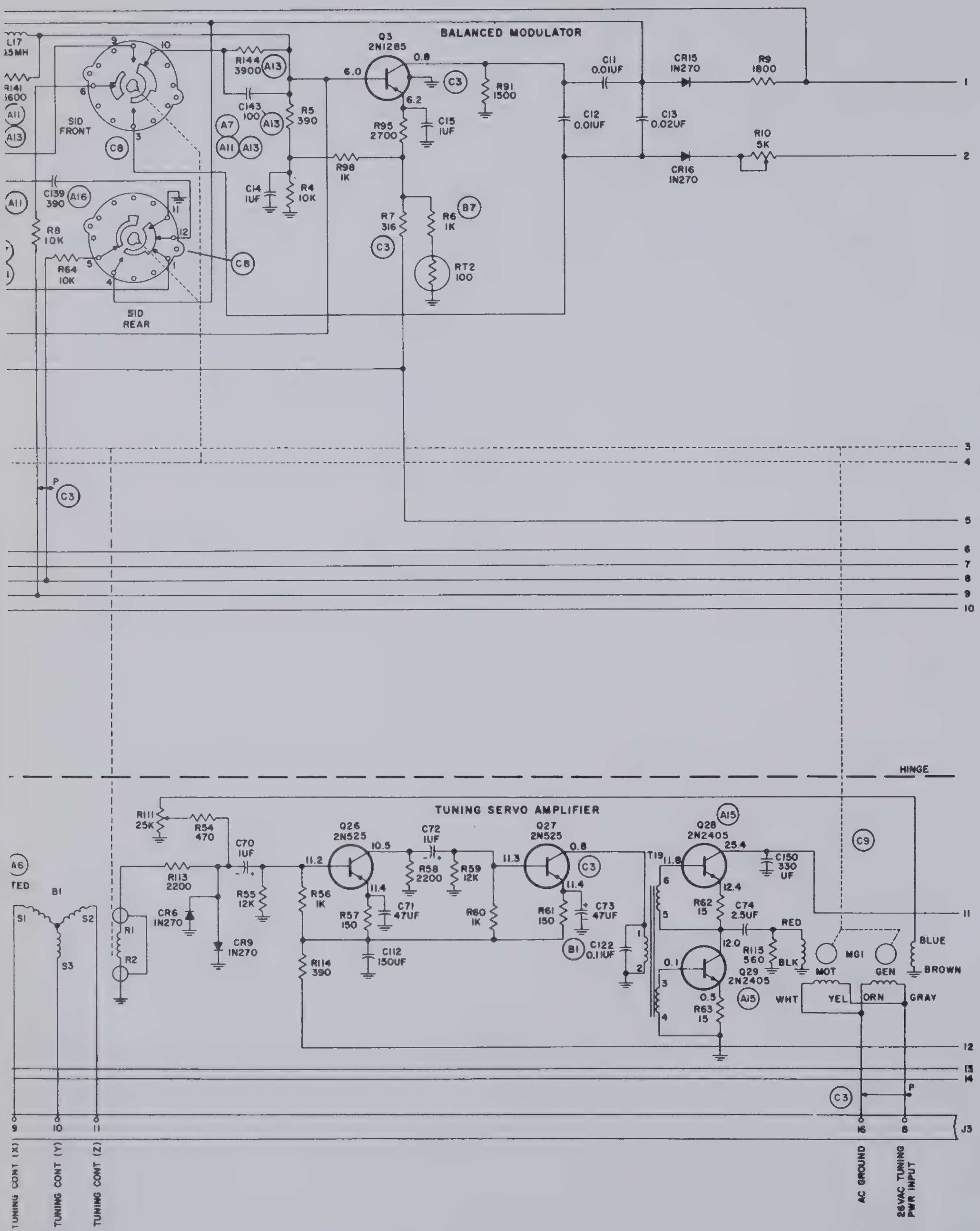

S1F
SIG FRONT
SIG REAR
SIE FRONT
SIE REAR
SID FRONT
SID REAR
T1
T2
T3
LOOP AMPL Q1 2N1285
BALANCED MODULATOR
Q3 2N1285
CR15 1N270
CR16 1N270
R9 1800
R10 5K
RT2 100
PART OF J2
B3
STATOR
ROTOR
J1
S5
HINGE
110 CPS OSC
Q22 2N1131
L24 2MH
L32 60MH
110 CPS AMPL
Q23 2N174
GEAR TRAIN
B5
LOOP SERVO AMPL
Q24 2N2405
Q25 2N2405
T18
C82 SELECTED
R133 SELECTED
B1
B4
TUNING SERVO AMPLIFIER
Q26 2N525
Q27 2N525
Q28 2N2405
Q29 2N2405
T19
MG1
MOT
GEN
J3
BEARING DATA (X)
BEARING DATA (Y)
BEARING DATA (Z)
BEARING DATA (H)
BEARING DATA (C)
MANUAL LOOP CONT DECREASE BEARING
MANUAL LOOP CONT INCREASE BEARING
MANUAL LOOP CONTROL COM
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT

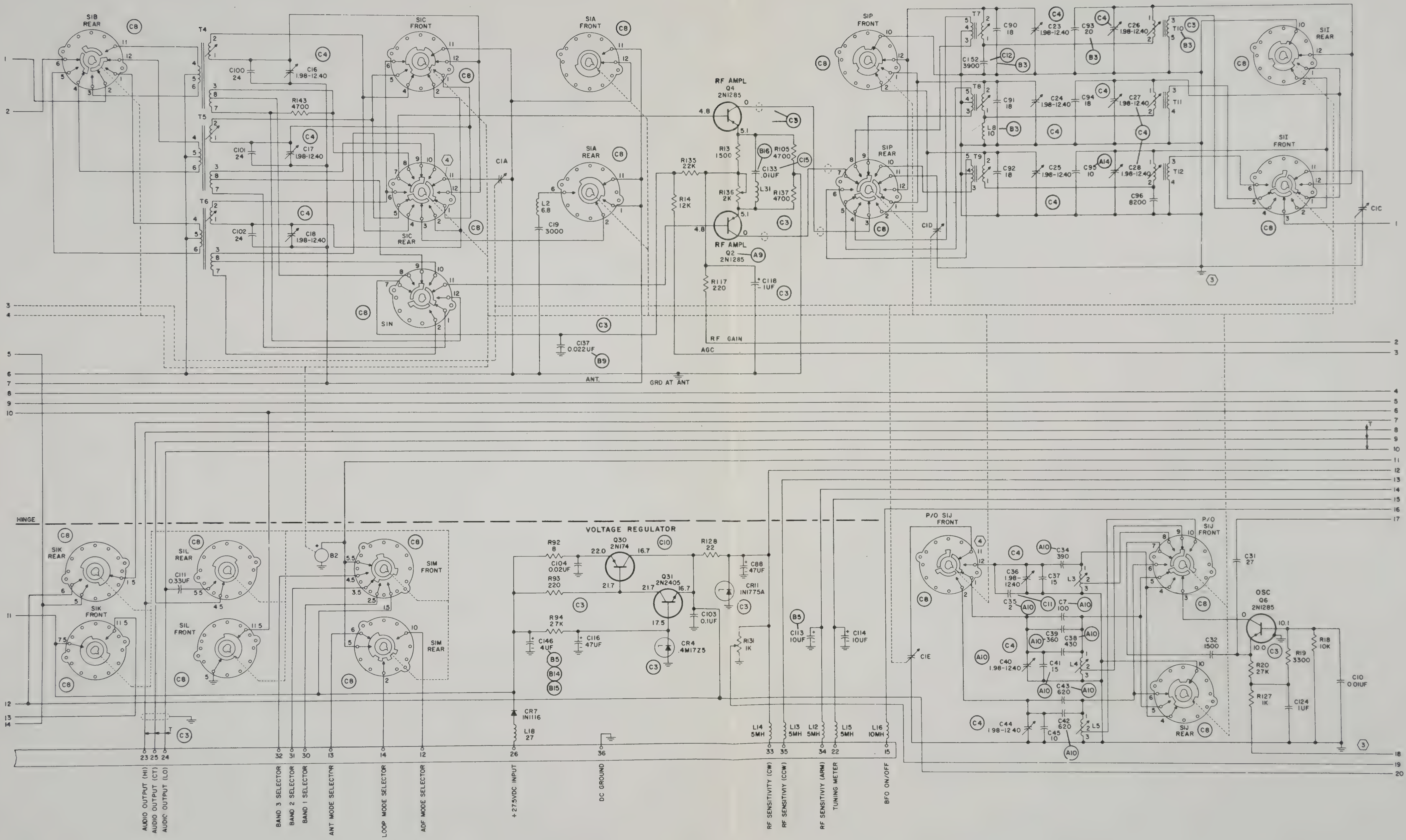
51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 2 of 4)
Figure 813


BALANCED MODULATOR
L17
.5MH
R141
5600
A11
A13
SID FRONT
C8
C139
390
A16
A11
R8
10K
R64
10K
SID REAR
R144
3900
A13
C143
100
A13
A7
A11
A13
R5
390
C14
1UF
R4
10K
R98
1K
Q3
2N1285
6.0
0.8
6.2
C3
R91
1500
R95
2700
C15
1UF
R7
316
R6
1K
B7
C3
RT2
100
C11
0.01UF
C12
0.01UF
C13
0.02UF
CR15
1N270
CR16
1N270
R9
1800
R10
5K
P
C3
1
2
3
4
5
6
7
8
9
10
HINGE
TUNING SERVO AMPLIFIER
A6
TED
B1
S1
S2
S3
R111
25K
R54
470
R113
2200
C70
1UF
R1
R2
CR6
1N270
CR9
1N270
R55
12K
11.2
Q26
2N525
10.5
11.4
R56
1K
R57
150
C71
47UF
R114
390
C112
150UF
C72
1UF
R58
2200
R59
12K
R60
1K
11.3
Q27
2N525
0.8
C3
11.4
R61
150
C73
47UF
B1
C122
0.11UF
T19
Q28
2N2405
A15
11.8
25.4
C150
330
UF
C9
12.4
R62
15
C74
2.5UF
12.0
R115
560
RED
BLK
0.1
Q29
2N2405
0.5
R63
15
A15
MG1
MOT
GEN
BLUE
BROWN
WHT
YEL
ORN
GRAY
11
12
13
14
C3
P
9
10
11
16
8
J3
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT

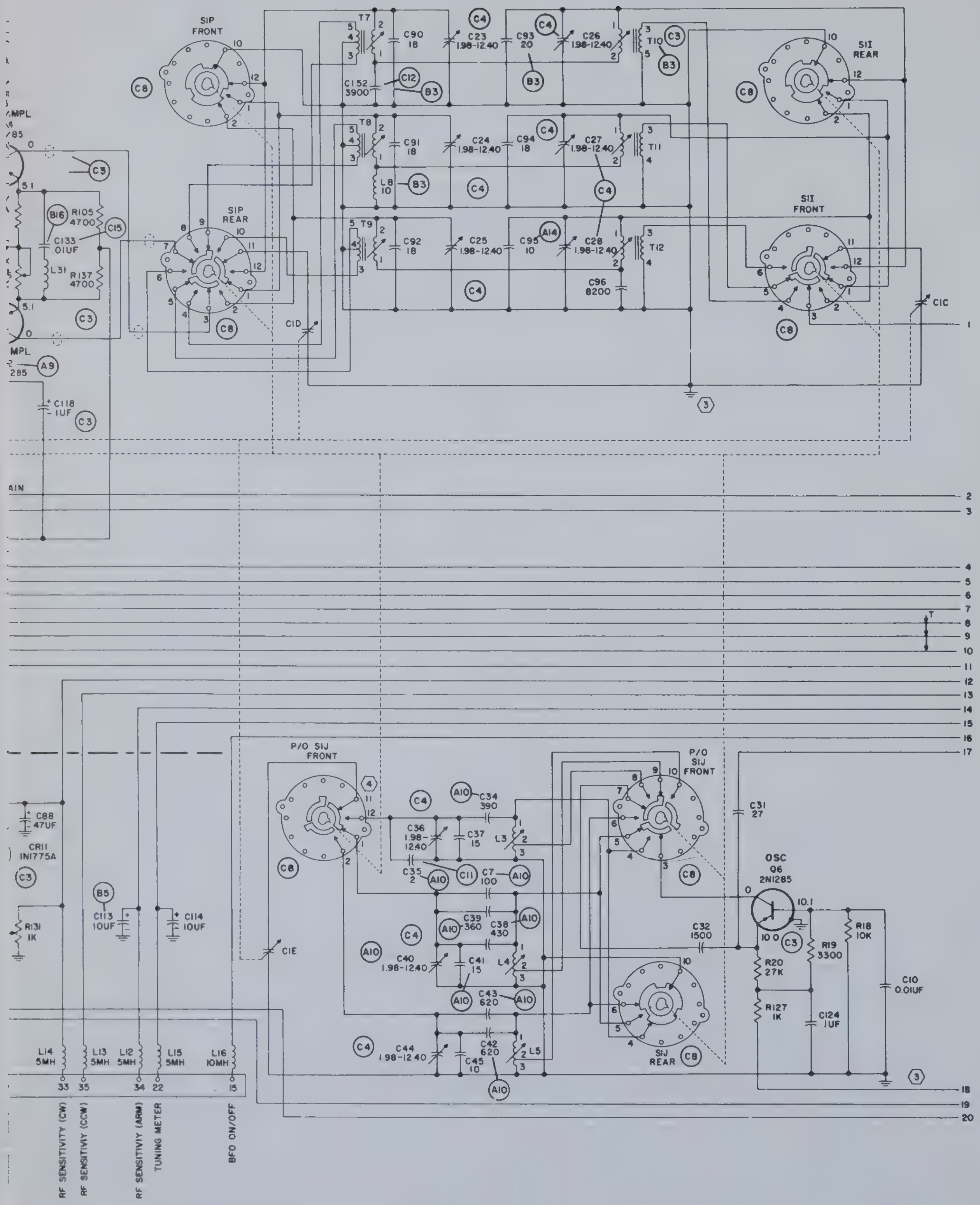

S1B REAR
C8
T4
C100 24
C16 1.98-12.40
C4
S1C FRONT
S1A FRONT
R143 4700
T5
C101 24
C17 1.98-12.40
S1C REAR
C1A
S1A REAR
L2 6.8
C19 3000
R135 22K
R14 12K
R13 1500
T6
C102 24
C18 1.98-12.40
S1N
C3
C137 0.022UF
B9
R117 220
RF A
2N12
4.8
AGC
RF G
ANT.
GRD AT ANT
HINGE
S1K REAR
S1K FRONT
S1L REAR
C111 0.33UF
S1L FRONT
B2
S1M FRONT
S1M REAR
VOLTAGE REGULATOR
R92 8
Q30 2N174
C10
C104 0.02UF
R93 220
Q31 2N2405
R128 22
C103 0.1UF
R94 27K
C146 4UF
C116 47UF
CR4 .4M17Z5
B5
B14
B15
CR7 IN1116
L18 27
T
23 25 24
32 31 30
13
14
12
26
36
AUDIO OUTPUT (HI)
AUDIO OUTPUT (CT)
AUDIO OUTPUT (LO)
BAND 3 SELECTOR
BAND 2 SELECTOR
BAND 1 SELECTOR
ANT. MODE SELECTOR
LOOP MODE SELECTOR
ADF MODE SELECTOR
+27.5VDC INPUT
DC GROUND

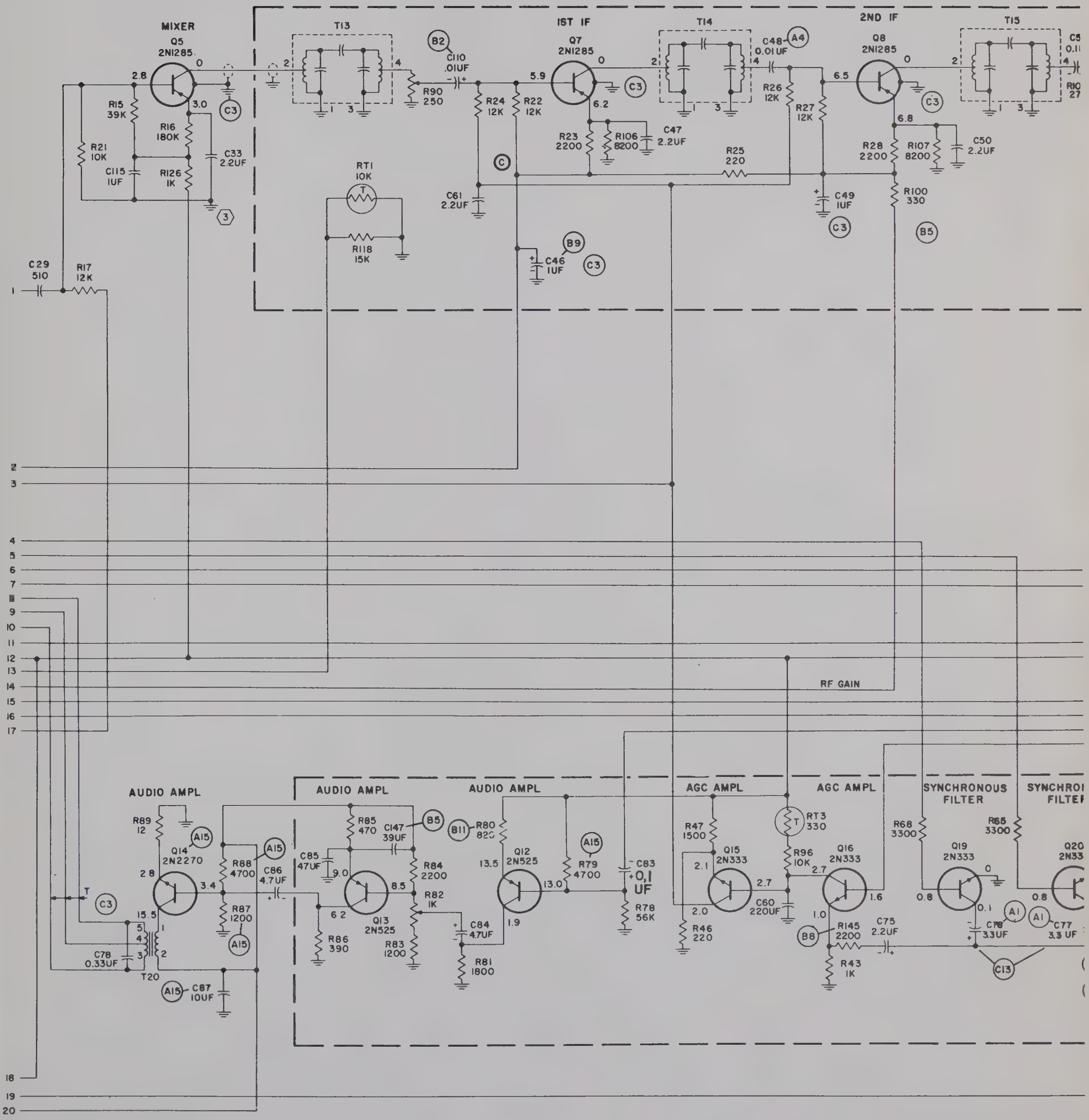
51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 3 of 4)
Figure 813


BALANCED MODULATOR
Q3
2N1285
6.0
0.8
6.2
C3
L17
.5MH
R141
5600
R144
3900
A13
C143
100
R5
390
A7
A11
S1D
FRONT
C8
C139
390
A16
R8
10K
R64
10K
S1D
REAR
C14
1UF
R4
10K
R98
1K
R95
2700
C15
1UF
R91
1500
R7
316
R6
1K
B7
RT2
100
C11
0.01UF
C12
0.01UF
C13
0.02UF
CR15
1N270
CR16
1N270
R9
1800
R10
5K
P
1
2
3
4
5
6
7
8
9
10
HINGE
TUNING SERVO AMPLIFIER
R111
25K
R54
470
R113
2200
C70
1UF
R55
12K
CR6
1N270
CR9
1N270
A6
B1
S1
S2
S3
R1
R2
11.2
Q26
2N525
10.5
11.4
R56
1K
R57
150
C71
47UF
C112
150UF
R114
390
C72
1UF
R58
2200
R59
12K
R60
1K
11.3
Q27
2N525
0.8
11.4
R61
150
C73
47UF
B1
C122
0.11UF
T19
Q28
2N2405
A15
11.8
25.4
12.4
R62
15
C74
2.5UF
C150
330
UF
12.0
0.1
R115
560
Q29
2N2405
0.5
R63
15
RED
BLK
C9
MG1
MOT
GEN
BLUE
BROWN
WHT
YEL
ORN
GRAY
11
12
13
14
J3
9
10
11
16
8
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING
PWR INPUT

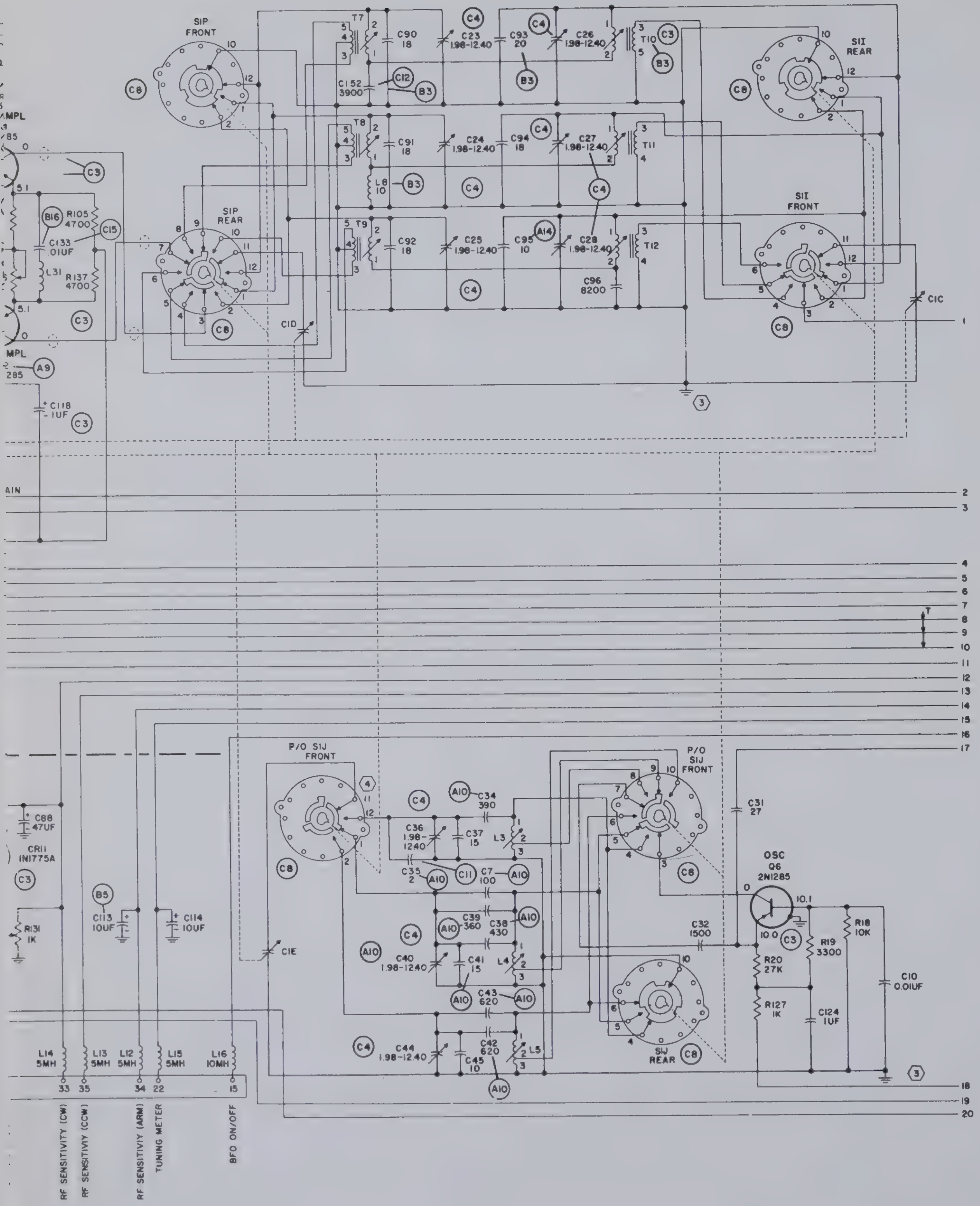

S1B REAR
S1C FRONT
S1A FRONT
S1A REAR
S1C REAR
S1N
S1P FRONT
S1P REAR
S1I REAR
S1I FRONT
T4
T5
T6
T7
T8
T9
T10
T11
T12
C100 24
C16 1.98-12.40
R143 4700
C101 24
C17 1.98-12.40
C102 24
C18 1.98-12.40
C1A
L2 6.8
C19 3000
C137 0.022UF
RF AMPL Q4 2N1285
RF AMPL Q2 2N1285
R135 22K
R14 12K
R13 1500
R136 2K
R105 4700
C133 .01UF
L31
R137 4700
R117 220
C118 1UF
RF GAIN
AGC
ANT.
GRD AT ANT
C152 3900
C90 18
C23 1.98-12.40
C93 20
C26 1.98-12.40
C91 18
L8 10
C24 1.98-12.40
C94 18
C27 1.98-12.40
C92 18
C25 1.98-12.40
C95 10
C28 1.98-12.40
C96 8200
C1D
C1C
HINGE
S1K REAR
S1K FRONT
S1L REAR
S1L FRONT
C111 0.33UF
B2
S1M FRONT
S1M REAR
VOLTAGE REGULATOR
R92 8
C104 0.02UF
Q30 2N174
R93 220
Q31 2N2405
R94 27K
C116 47UF
C146 4UF
R128 22
C88 47UF
CR11 1N1775A
C103 0.1UF
CR4 .4M17Z5
R131 1K
CR7 1N1116
L18 27
C113 10UF
C114 10UF
C1E
P/O S1J FRONT
P/O S1J FRONT
S1J REAR
C34 390
C36 1.98-1240
C37 15
L3
C35 2
C7 100
C39 360
C38 430
C40 1.98-1240
C41 15
L4
C43 620
C44 1.98-12.40
C42 620
C45 10
L5
C31 27
OSC Q6 2N1285
C32 1500
R20 27K
R19 3300
R18 10K
R127 1K
C124 1UF
C10 0.001UF
L14 5MH
L13 5MH
L12 5MH
L15 5MH
L16 10MH
AUDIO OUTPUT (HI)
AUDIO OUTPUT (CT)
AUDIO OUTPUT (LO)
BAND 3 SELECTOR
BAND 2 SELECTOR
BAND 1 SELECTOR
ANT MODE SELECTOR
LOOP MODE SELECTOR
ADF MODE SELECTOR
+27.5VDC INPUT
DC GROUND
RF SENSITIVITY (CW)
RF SENSITIVITY (CCW)
RF SENSITIVITY (ARM)
TUNING METER
BFO ON/OFF

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 3 of 4)
Figure 813

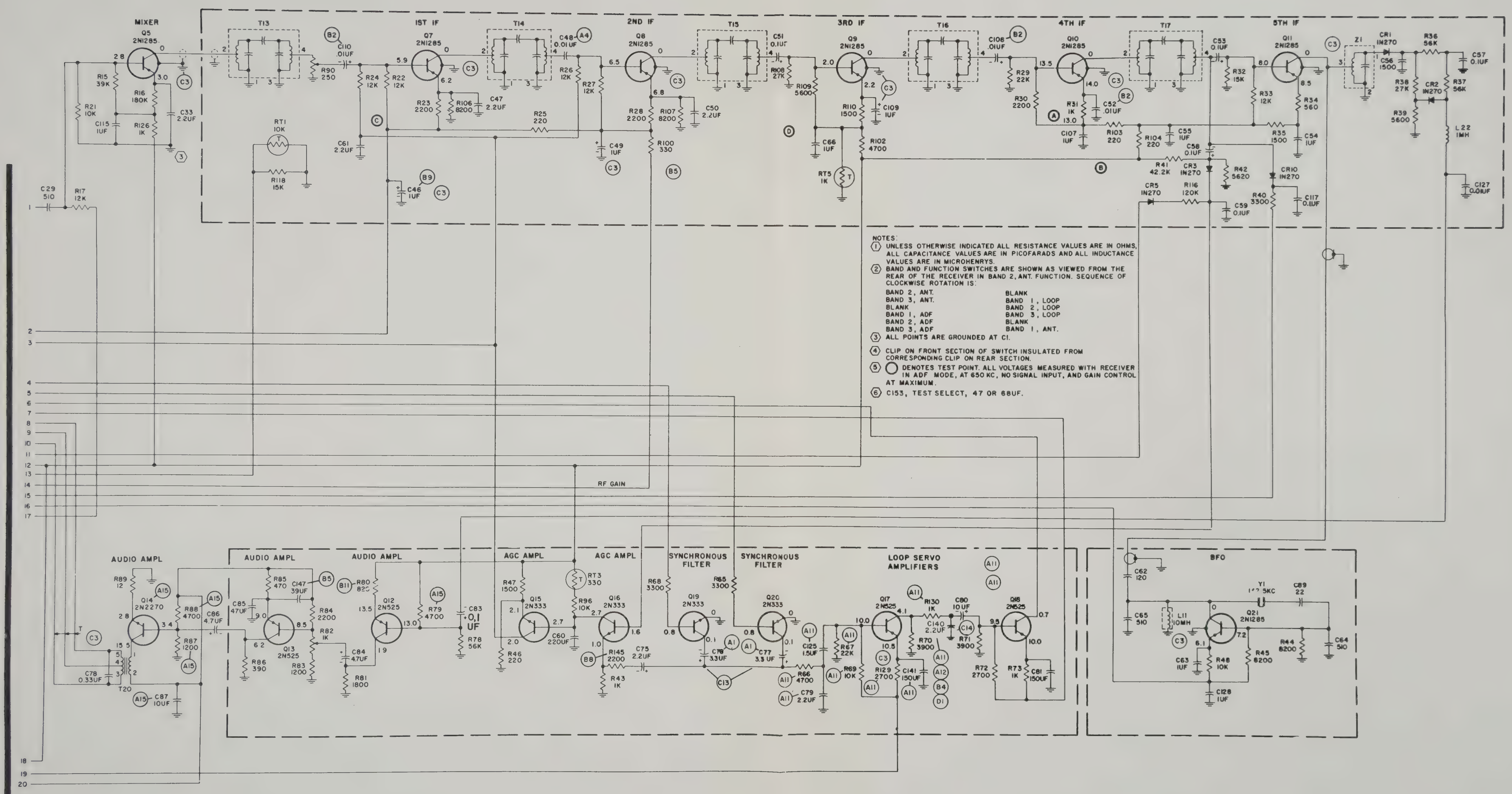

SIP FRONT
SIP REAR
SII REAR
SII FRONT
P/O SIJ FRONT
SIJ REAR
T7
T8
T9
T10
T11
T12
C90 18
C91 18
C92 18
C23 1.98-12.40
C24 1.98-12.40
C25 1.98-12.40
C93 20
C94 18
C95 10
C26 1.98-12.40
C27 1.98-12.40
C28 1.98-12.40
C152 3900
C96 8200
L8 10
C1C
C1D
C1E
R105 4700
C133 .01UF
L31
R137 4700
C118 1UF
MPL
285
AIN
C88 47UF
CR11 1N1775A
R131 1K
C113 10UF
C114 10UF
C34 390
C36 1.98-12.40
C37 15
L3
C35 2
C7 100
C39 360
C38 430
C40 1.98-12.40
C41 15
L4
C43 620
C44 1.98-12.40
C45 10
C42 620
L5
C31 27
OSC Q6 2N1285
C32 1500
R20 27K
R127 1K
R19 3300
R18 10K
C124 1UF
C10 0.01UF
L14 5MH
L13 5MH
L12 5MH
L15 5MH
L16 10MH
33
35
34
22
15
RF SENSITIVITY (CW)
RF SENSITIVIY (CCW)
RF SENSITIVIY (ARM)
TUNING METER
BFO ON/OFF
C3
C4
C8
C11
C12
C15
B3
B5
B16
A9
A10
A14
3
4
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20


MIXER
Q5
2N1285
2.8
0
3.0
R15
39K
R16
180K
C33
2.2UF
R21
10K
C115
1UF
R126
1K
C3
3
T13
2
4
1
3
B2
C110
.01UF
R90
250
R24
12K
R22
12K
C
RT1
10K
T
R118
15K
C61
2.2UF
B9
C46
1UF
IST IF
Q7
2N1285
5.9
0
6.2
R23
2200
R106
8200
C47
2.2UF
T14
C48
0.01UF
A4
R26
12K
R27
12K
R25
220
C49
1UF
2ND IF
Q8
2N1285
6.5
0
6.8
R28
2200
R107
8200
C50
2.2UF
R100
330
B5
T15
C29
510
R17
12K
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
RF GAIN
AUDIO AMPL
R89
12
A15
Q14
2N2270
2.8
3.4
15.5
R88
4700
C86
4.7UF
R87
1200
C78
0.33UF
T20
C87
10UF
AUDIO AMPL
R85
470
C147
39UF
C85
47UF
9.0
8.5
6.2
Q13
2N525
R84
2200
R82
1K
R86
390
R83
1200
C84
4.7UF
R81
1800
AUDIO AMPL
B11
R80
820
13.5
Q12
2N525
13.0
1.9
R79
4700
C83
0.1
UF
R78
56K
AGC AMPL
R47
1500
Q15
2N333
2.1
2.0
2.7
C60
220UF
R46
220
AGC AMPL
RT3
330
R96
10K
Q16
2N333
2.7
1.6
1.0
B8
R145
2200
C75
2.2UF
R43
1K
SYNCHRONOUS
FILTER
R68
3300
Q19
2N333
0.8
0
0.1
C78
3.3UF
A1
C13
R65
3300
Q20
0.8
C77
3.3 UF

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 4 of 4)
Figure 813



AMPL
285
MPL
285
51
5.1
0
R105 4700
R137 4700
C133 .01UF
L31
B16
C15
C3
A9
C118 1UF
AIN
SIP FRONT
SIP REAR
C8
T7
C90 18
C23 1.98-12.40
C93 20
C26 1.98-12.40
T10
C152 3900
C12
B3
C4
SII REAR
T8
C91 18
C24 1.98-12.40
C94 18
C27 1.98-12.40
T11
L8 10
T9
C92 18
C25 1.98-12.40
C95 10
A14
C28 1.98-12.40
T12
C96 8200
SII FRONT
C1C
C1D
3
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
T
C88 47UF
CR11 1N1775A
R131 1K
B5
C113 10UF
C114 10UF
C1E
P/O SIJ FRONT
4
A10
C34 390
C36 1.98-1240
C37 15
L3
C35 2
C11
C7 100
C39 360
C38 430
C40 1.98-1240
C41 15
L4
C43 620
C44 1.98-12.40
C42 620
C45 10
L5
SIJ REAR
P/O SIJ FRONT
C31 27
OSC Q6 2N1285
C32 1500
R20 27K
R127 1K
R19 3300
R18 10K
C124 1UF
C10 0.01UF
18
19
20
L14 5MH
L13 5MH
L12 5MH
L15 5MH
L16 10MH
33
35
34
22
15
RF SENSITIVITY (CW)
RF SENSITIVIY (CCW)
RF SENSITIVIY (ARM)
TUNING METER
BFO ON/OFF


MIXER
Q5 2N1285
T13
B2
C110 .01UF
R90 250
1ST IF
Q7 2N1285
T14
C48 0.01UF
A4
2ND IF
Q8 2N1285
T15
C51 0.1UF
3RD IF
Q9 2N1285
T16
C108 .01UF
4TH IF
Q10 2N1285
T17
C53 0.1UF
5TH IF
Q11 2N1285
Z1
CR1 1N270
R36 56K
C57 0.1UF
C56 1500
R38 27K
CR2 1N270
R37 56K
R39 5600
L22 1MH
C127 0.01UF
R15 39K
R16 180K
R21 10K
C115 1UF
R126 1K
C33 2.2UF
RT1 10K
R118 15K
R24 12K
R22 12K
C61 2.2UF
C46 1UF
R23 2200
R106 8200
C47 2.2UF
R25 220
R26 12K
R27 12K
C49 1UF
R28 2200
R107 8200
C50 2.2UF
R100 330
R108 27K
R109 5600
R110 1500
C109 1UF
C66 1UF
RT5 1K
R102 4700
R29 22K
R30 2200
R31 1K
C52 .01UF
C107 1UF
R103 220
R104 220
C55 1UF
C58 0.1UF
R41 42.2K
CR3 1N270
R42 5620
R32 15K
R33 12K
R34 560
R35 1500
C54 1UF
CR10 1N270
R40 3300
C117 0.1UF
CR5 1N270
R116 120K
C59 0.1UF
C29 510
R17 12K
RF GAIN
AUDIO AMPL
Q14 2N2270
R89 12
R88 4700
R87 1200
C86 4.7UF
C78 0.33UF
T20
C87 10UF
AUDIO AMPL
R85 470
C147 39UF
C85 47UF
Q13 2N525
R84 2200
R82 1K
R86 390
R83 1200
AUDIO AMPL
R80 820
Q12 2N525
C84 47UF
R81 1800
R79 4700
C83 0.1 UF
R78 56K
AGC AMPL
R47 1500
Q15 2N333
R46 220
C60 220UF
AGC AMPL
RT3 330
R96 10K
Q16 2N333
R145 2200
R43 1K
C75 2.2UF
SYNCHRONOUS FILTER
R68 3300
Q19 2N333
C78 33UF
SYNCHRONOUS FILTER
R65 3300
Q20 2N333
C77 3.3 UF
R66 4700
C79 2.2UF
LOOP SERVO AMPLIFIERS
C125 1.5UF
R67 22K
R69 10K
Q17 2N525
R129 2700
C141 150UF
R130 1K
C140 2.2UF
C80 10UF
R70 3900
R71 3900
R72 2700
Q18 2N525
R73 1K
C81 150UF
BFO
C62 120
C65 510
L11 10MH
Y1 142.5KC
C89 22
Q21 2N1285
C63 1UF
R48 10K
C128 1UF
R45 6200
R44 8200
C64 510
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

NOTES:

① UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

② BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:

BAND 2, ANT.
BAND 3, ANT.
BLANK
BAND 1, ADF
BAND 2, ADF
BAND 3, ADF
BLANK
BAND 1, LOOP
BAND 2, LOOP
BAND 3, LOOP
BLANK
BAND 1, ANT.

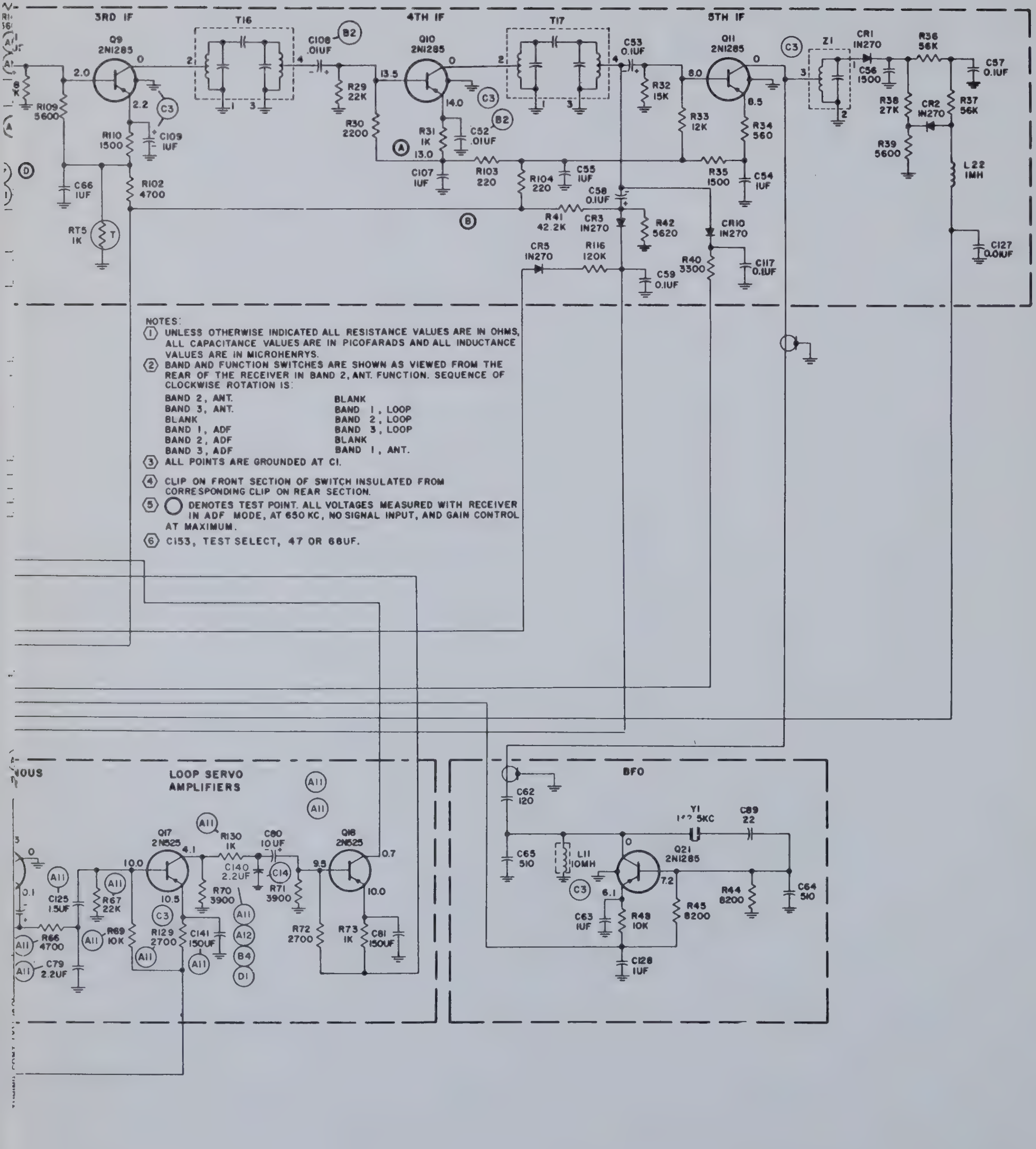
③ ALL POINTS ARE GROUNDED AT C1.

④ CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.

⑤ ○ DENOTES TEST POINT. ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650 KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.

⑥ C153, TEST SELECT, 47 OR 68UF.

51Y-4 ADF Receiver, Through MCN 1687, Schematic Diagram (Sheet 4 of 4)
Figure 813


3RD IF
Q9
2N1285
T16
C108
.01UF
4TH IF
Q10
2N1285
T17
C53
0.1UF
5TH IF
Q11
2N1285
Z1
CR1
1N270
R36
56K
C57
0.1UF
C56
1500
R38
27K
CR2
1N270
R37
56K
R39
5600
L22
1MH
C127
0.01UF
R109
5600
R110
1500
C109
1UF
C66
1UF
R102
4700
RT5
1K
R29
22K
R30
2200
R31
1K
C52
.01UF
C107
1UF
R103
220
R104
220
C55
1UF
R32
15K
R33
12K
R34
560
R35
1500
C54
1UF
C58
0.1UF
R41
42.2K
CR3
1N270
R42
5620
CR10
1N270
CR5
1N270
R116
120K
C59
0.1UF
R40
3300
C117
0.1UF
LOOP SERVO
AMPLIFIERS
Q17
2N525
R130
1K
C80
10UF
C140
2.2UF
R70
3900
R71
3900
Q18
2N525
C125
1.5UF
R67
22K
R66
4700
C79
2.2UF
R69
10K
R129
2700
C141
150UF
R72
2700
R73
1K
C81
150UF
BFO
C62
120
C65
510
L11
10MH
Y1
C89
22
Q21
2N1285
C63
1UF
R48
10K
R45
8200
R44
8200
C64
510
C128
1UF

NOTES:

① UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

② BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:

BAND 2, ANT.
BAND 3, ANT.
BLANK
BAND 1, ADF
BAND 2, ADF
BAND 3, ADF
BLANK
BAND 1, LOOP
BAND 2, LOOP
BAND 3, LOOP
BLANK
BAND 1, ANT.

③ ALL POINTS ARE GROUNDED AT C1.

④ CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.

⑤ ○ DENOTES TEST POINT. ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650 KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.

⑥ C153, TEST SELECT, 47 OR 68UF.

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	A1	Capacitor C151, 68 pf, is changed to a selected value.	To adjust frequency of 110-Hz oscillator.		
4	A1	Note ⟨6⟩ is changed to include C151 and increased number of select values.			
2	A2	Capacitor C166, 12 pf, is added.	Added capacity required for receiver tracking.		
2	A3	Resistor R141, 5600 ohms, is changed to 2700 ohms.	To increase percentage of modulation for improved operation at high frequencies.		
3	A4	Capacitors C167, C168 and C169, 5 pf, are added.	To improve tuning capability.		
3	A5	Resistor R165, 560 ohms, is added.	Change range of adjustment for gain of loop servo amplifier.		
3	A6	Coil L16, 10 mh, is changed to resistor R157, 68 ohms.	To reduce the amount of bfo radiation.		
4	A7	Capacitor C87, 10 uf, is changed to 68 uf.	Increased decoupling of audio from B+.		

51Y-4 ADF Receiver, MCN 1688 and Above, Schematic Diagram (Sheet 1A of 4)
Figure 813A

51Y-4 ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	A8	Capacitor C84, 4.7 uf, is changed to .33 uf.	Improve response curve of audio stages.		
4	A9	Resistor R80, 1K, is changed to 560 ohms.	Adjust overall gain of audio stages.		
4	A10	Resistor R71, 3900 ohms, is changed to 8200 ohms.	Increase dynamic range of signal handling capability of stage.		
4	A11	Resistor R72, 2700 ohms, is changed to 4700 ohms.	Same as above.		
4	A12	Resistor R73, 1K, is changed to 680 ohms.	Same as above.		
4	A13	Resistor R130, 2700 ohms, is changed to 4700 ohms.	Reduce gain of loop servo amplifier.		
4	A14	Resistor R166, 1K, is added.	Reduce gain to eliminate high frequency oscillation.	30	MCN 3013 and above
4	A15	Resistor R167, 1K, is added.	Same as above.	30	MCN 3013 and above
4	A16	Resistor R40, 3300 ohms, is changed to 2700 ohms.	Change signal level to tuning meter because of new meter type.		
4	A17	Ground connections of C63, C64, C65, C128, L11, and R44 are changed to shield of output coax cable.	Reduce amount of bfo radiation.		

51Y-4 ADF Receiver, MCN 1688 and Above, Schematic Diagram (Sheet 1B of 4)
Figure 813A

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	B1	Circuit involving Q1, Q3, S1D, and S1E is changed.	Design change for improved operation.		MCN 5422 and above.
2	B2	Changed C74 from 2.5 μ F to 1.5 μ F.	Design change for improved operation.	31	MCN 5422 and above.
2	B3	Changed C150 from 330 μ F to 560 pF.	To eliminate high frequency oscillation in tuning of servo amplifier.		MCN 3300 and above.
2	B4	Changed Q27 from type 2N525 to type 2N3638A.	Design change for improved operation.		MCN 5422 and above.
3	B5	Changed R143 from 4700 ohms to 3900 ohms.	Design change for improved operation.		MCN 5422 and above.
3	B6	Changed R92 from 8 ohms to 8.2 ohms.	Correct drawing error.		All.
3	B7	Changed R94 from 27 kilohms to 2700 ohms.	Correct drawing error.		All.
3	B8	Changed CR4 from 4M17Z5 to .4M17Z5.	Correct drawing error.		All.
3	B9	Resistor, R165, 560 ohms, deleted.	Design change for improved operation.		MCN 5422 and above.

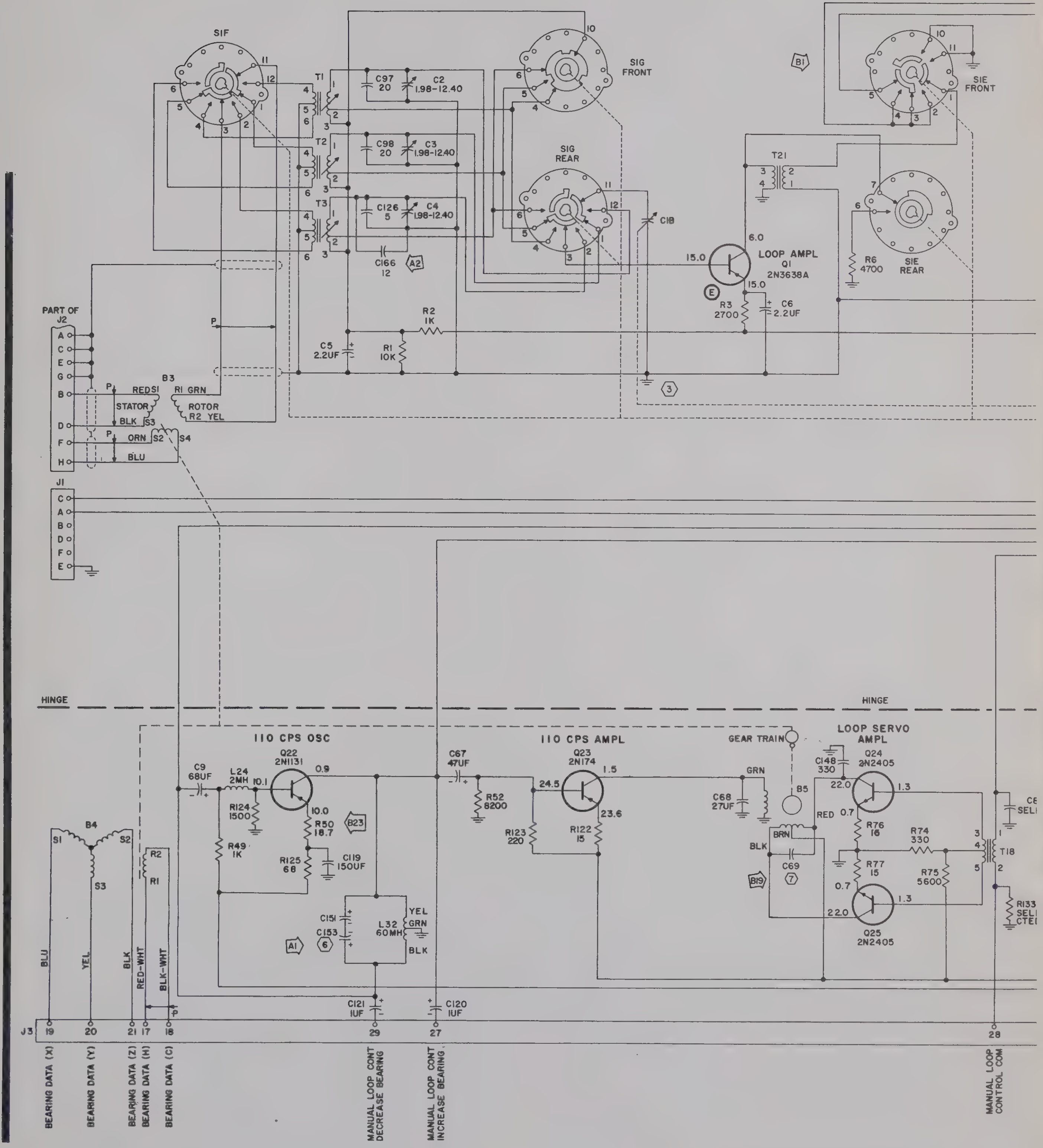
51Y-4 ADF Receiver, MCN 1688 and Above, Schematic Diagram (Sheet 1C of 4)
Figure 813A

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	B10	Changed C88 from 47 μ F to 150 μ F.	To reduce noise level on B+ line.		MCN 1688 and above.
3	B11	Added C37, 10 pF, from L4-3 to S1J-1.	Improve temperature stability of injection oscillator.		MCN 1688 and above.
3	B12	Changed C37, 15 μF, to C35, 15 μF.	Design change related to B11.		MCN 1688 and above.
3	B13	Changed C38 from 330 pF to 430 pF.	Correct drawing error.		MCN 547 and above.
3	B14	Changed R19 from 3300 ohms to 2200 ohms.	Change operating bias of Q6 for reduced collector to base capacitance.		MCN 1688 and above.
3	B15	Changed C41 from 15 pF to 5 pF.	Improve temperature stability of injection oscillator.		MCN 1688 and above.
3	B16	Changed C45 from 10 pF to 5 pF.	Design change for improved operation.		MCN 3314 and above.
3	B17	Changed Q6 from 2N3638A to 2N2905A.	Improve temperature stability of injection oscillator.		MCN 1688 and above.
3	B18	Changed C37 from 10 pF to 7 pF.	Design change for improved operation.		MCN 4553 and above.

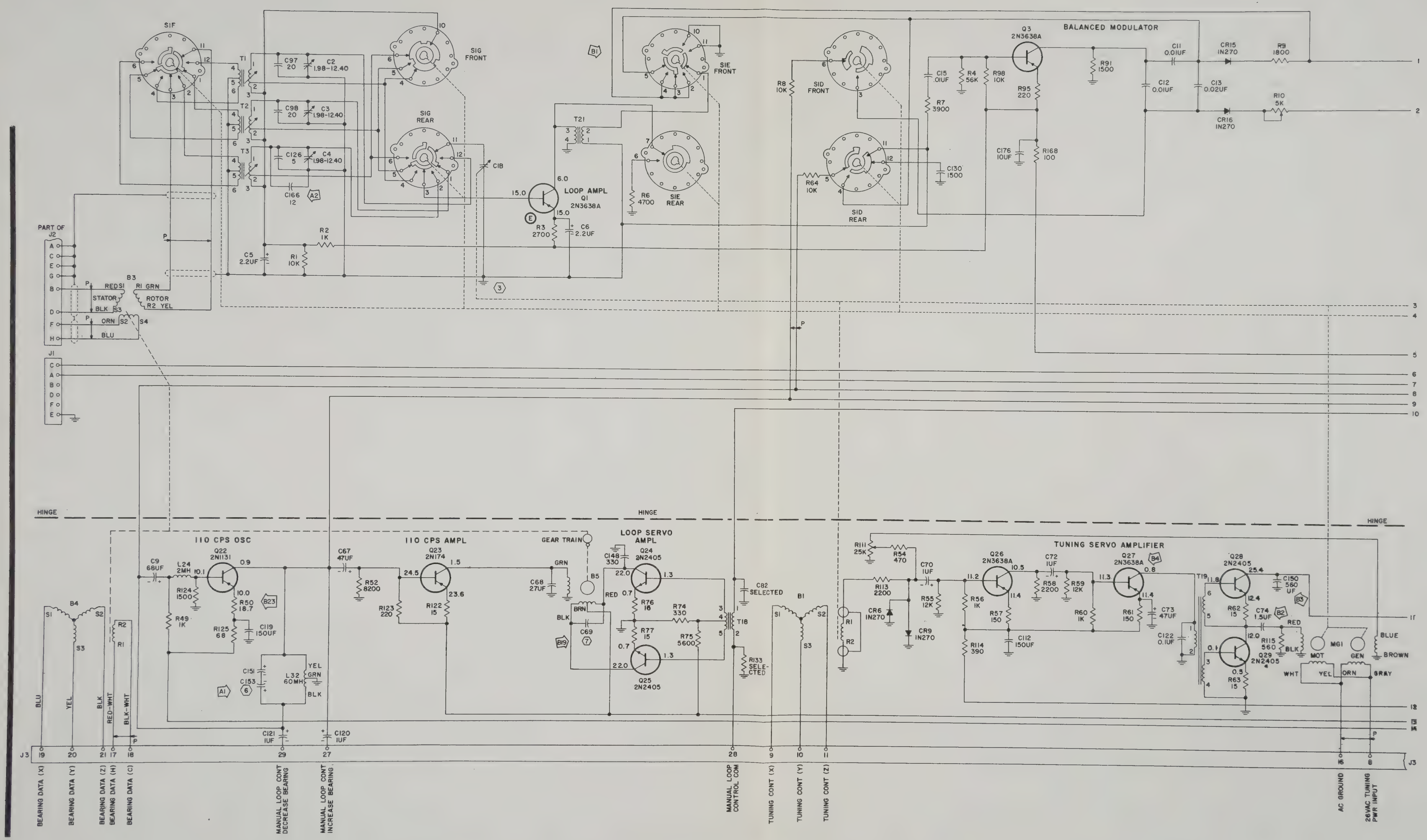
51Y-4 ADF Receiver, MCN 1688 and Above, Schematic Diagram (Sheet 1D of 4)
Figure 813A

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	B19	Deleted value from C69 and added note 7.	Design change for improved operation.	33	MCN 3984 and above.
4	B20	Added R169 120 kilohms.	Eliminate "thump" in audio output when 614L-8 mode switch is changed from ADF to ANT position.	35	MCN 3925 and above.
4	B21	Changed R24 from 12 kilohms to 15 kilohms.	Improve receiver gain.		MCN 1688 and above.
4	B22	Changed R80 from 560 ohms to 820 ohms.	Decrease gain of audio amplifier.		
2	B23	Changed R50 from 22 ohms to 18.7 ohms.	Design change for improved operation.		MCN 5548 and above.

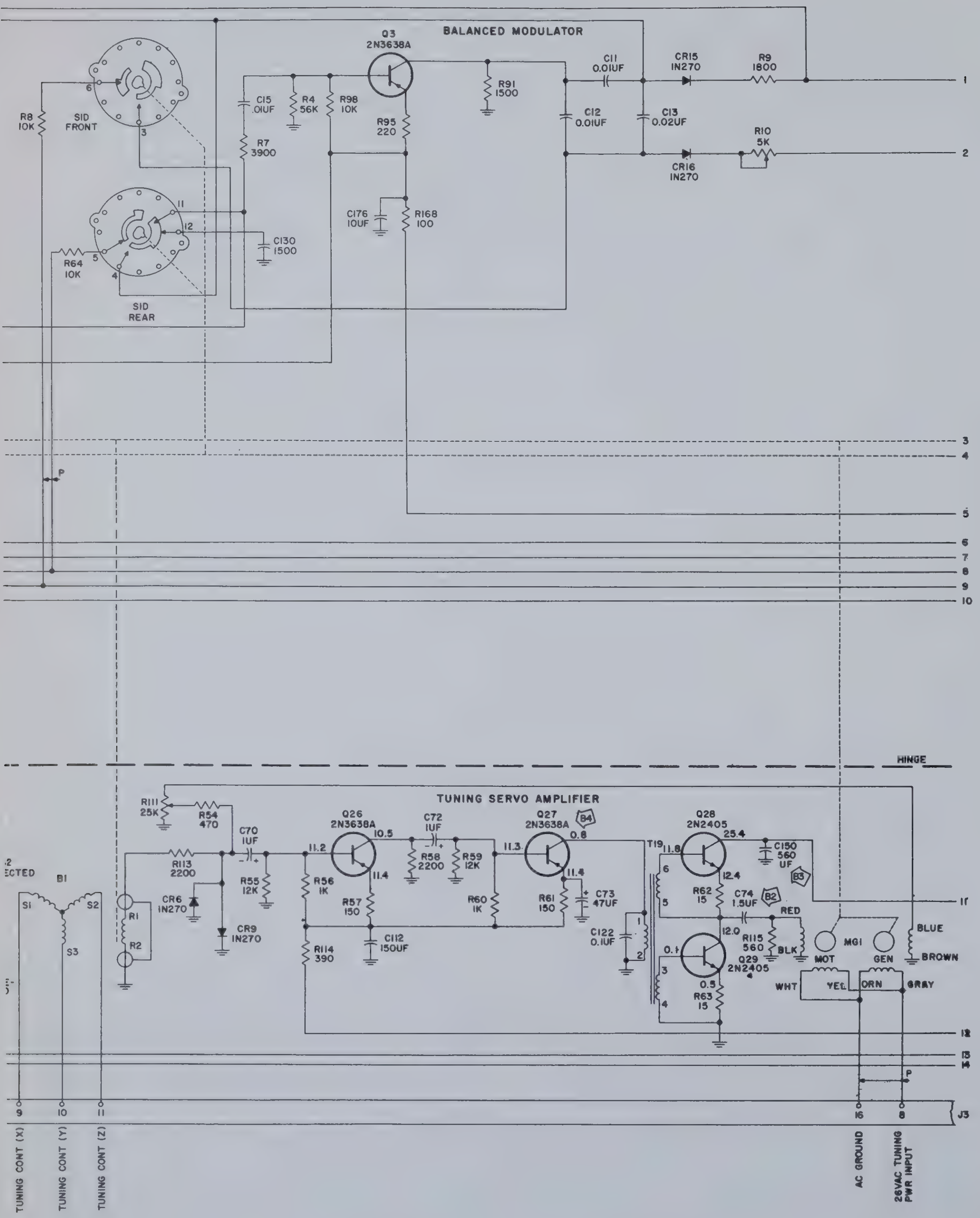
51Y-4 ADF Receiver, MCN 1688 and Above, Schematic Diagram (Sheet 1E of 4)
Figure 813A


SIF
SIG FRONT
SIG REAR
SIE FRONT
SIE REAR
T1
T2
T3
T21
C97 20
C2 1.98-12.40
C98 20
C3 1.98-12.40
C126 5
C4 1.98-12.40
C166 12
A2
B1
C18
LOOP AMPL
Q1
2N3638A
15.0
6.0
R3 2700
C6 2.2UF
R6 4700
R2 1K
R1 10K
C5 2.2UF
E
3
PART OF J2
A
C
E
G
B
D
F
H
P
B3
REDS1
R1 GRN
STATOR
BLK
S3
ROTOR
R2 YEL
ORN
S2
S4
BLU
J1
HINGE
110 CPS OSC
Q22
2N1131
C9 68UF
L24 2MH
10.1
0.9
10.0
R124 1500
R49 1K
R50 18.7
R125 68
C119 150UF
B23
C151
C153
L32 60MH
YEL
GRN
BLK
A1
6
C121 1UF
C120 1UF
110 CPS AMPL
Q23
2N174
C67 47UF
R52 8200
24.5
1.5
23.6
R123 220
R122 15
GEAR TRAIN
B5
GRN
C68 27UF
BRN
BLK
RED
C69
7
B19
LOOP SERVO AMPL
Q24
2N2405
C148 330
22.0
1.3
0.7
R76 16
R74 330
R77 15
R75 5600
T18
Q25
2N2405
R133
B4
S1
S2
S3
R2
R1
BLU
YEL
BLK
RED-WHT
BLK-WHT
J3
19
20
21
17
18
29
27
28
BEARING DATA (X)
BEARING DATA (Y)
BEARING DATA (Z)
BEARING DATA (H)
BEARING DATA (C)
MANUAL LOOP CONT DECREASE BEARING
MANUAL LOOP CONT INCREASE BEARING
MANUAL LOOP CONTROL COM

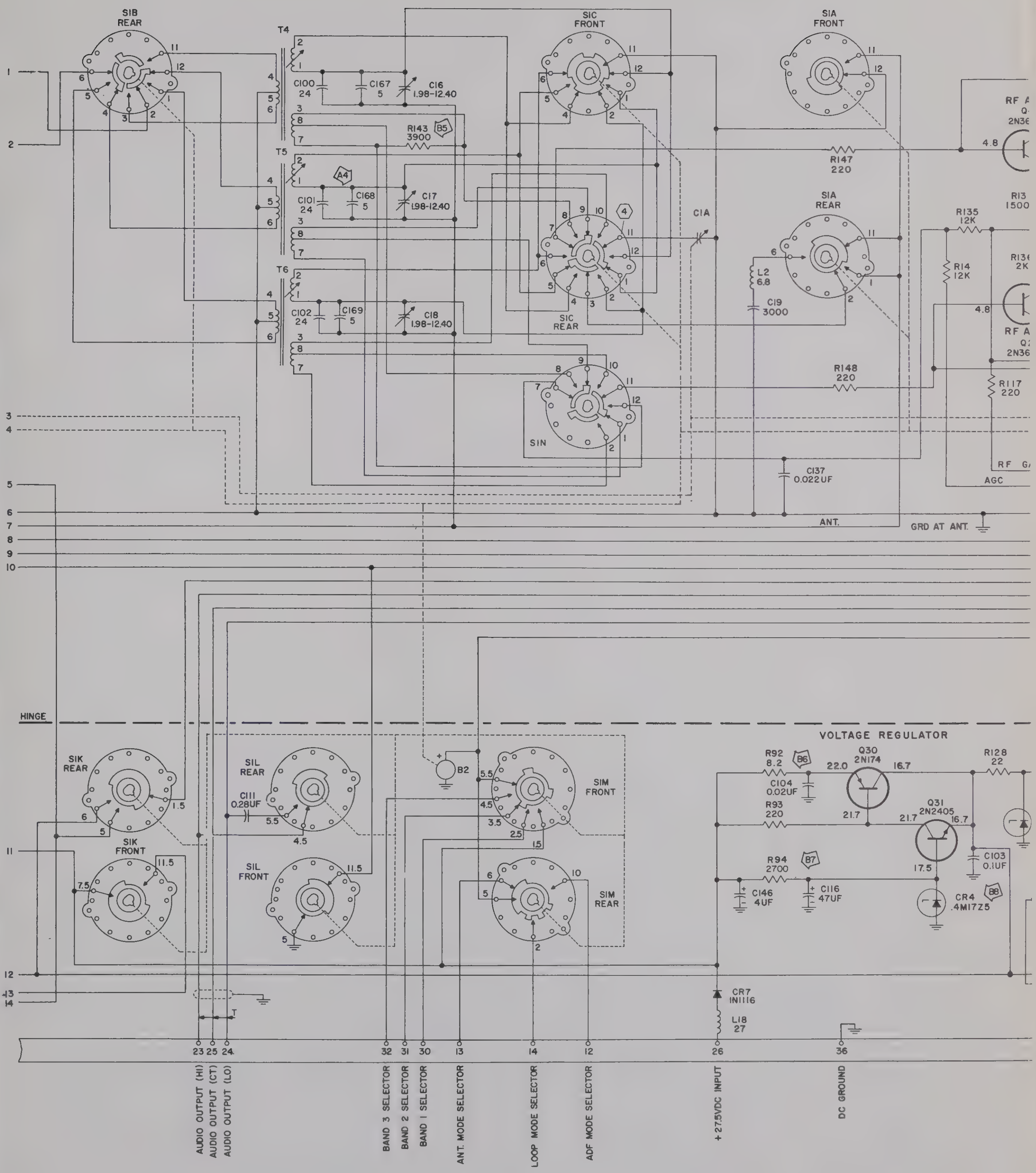
51Y-4 ADF Receiver, MCN 1688 and Above,
Schematic Diagram (Sheet 2 of 4)
Figure 813A


S1F
T1
T2
T3
C97 20
C2 1.98-12.40
C98 20
C3 1.98-12.40
C126 5
C4 1.98-12.40
C166 12
A2
SIG FRONT
SIG REAR
C18
B1
T21
LOOP AMPL Q1 2N3638A
R3 2700
C6 2.2UF
R6 4700
SIE FRONT
SIE REAR
R8 10K
SID FRONT
SID REAR
R64 10K
R7 3900
C15 .01UF
R4 56K
R98 10K
Q3 2N3638A
BALANCED MODULATOR
R91 1500
R95 220
C176 10UF
R168 100
C130 1500
C11 0.01UF
C12 0.01UF
C13 0.02UF
CR15 1N270
CR16 1N270
R9 1800
R10 5K
PART OF J2
C5 2.2UF
R1 10K
R2 1K
B3
RED S1
R1 GRN
STATOR
ROTOR
BLK S3
R2 YEL
ORN S2
S4
BLU
J1
HINGE
110 CPS OSC
Q22 2N1131
C9 68UF
L24 2MH
R124 1500
R50 18.7
R49 1K
R125 68
C119 150UF
B23
C151
C153
L32 60MH
YEL
GRN
BLK
A1
C121 1UF
C120 1UF
110 CPS AMPL
C67 47UF
R52 8200
Q23 2N174
R123 220
R122 15
GEAR TRAIN
C68 27UF
GRN
B5
BRN
RED
BLK
C69
B19
LOOP SERVO AMPL
C148 330
Q24 2N2405
R76 16
R77 15
R74 330
R75 5600
Q25 2N2405
C82 SELECTED
T18
R133 SELECTED
B1
TUNING SERVO AMPLIFIER
R111 25K
R54 470
R113 2200
C70 1UF
CR6 1N270
CR9 1N270
R55 12K
Q26 2N3638A
R56 1K
R57 150
R114 390
C112 150UF
C72 1UF
R58 2200
R59 12K
Q27 2N3638A
B4
R60 1K
R61 150
C73 47UF
C122 0.1UF
T19
Q28 2N2405
C150 560 UF
R62 15
C74 1.5UF
B3
B2
R115 560
Q29 2N2405
R63 15
MG1
MOT
GEN
BLUE
BROWN
WHT
YEL
ORN
GRAY
J3
BEARING DATA (X)
BEARING DATA (Y)
BEARING DATA (Z)
BEARING DATA (H)
BEARING DATA (C)
MANUAL LOOP CONT DECREASE BEARING
MANUAL LOOP CONT INCREASE BEARING
MANUAL LOOP CONTROL COM
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT

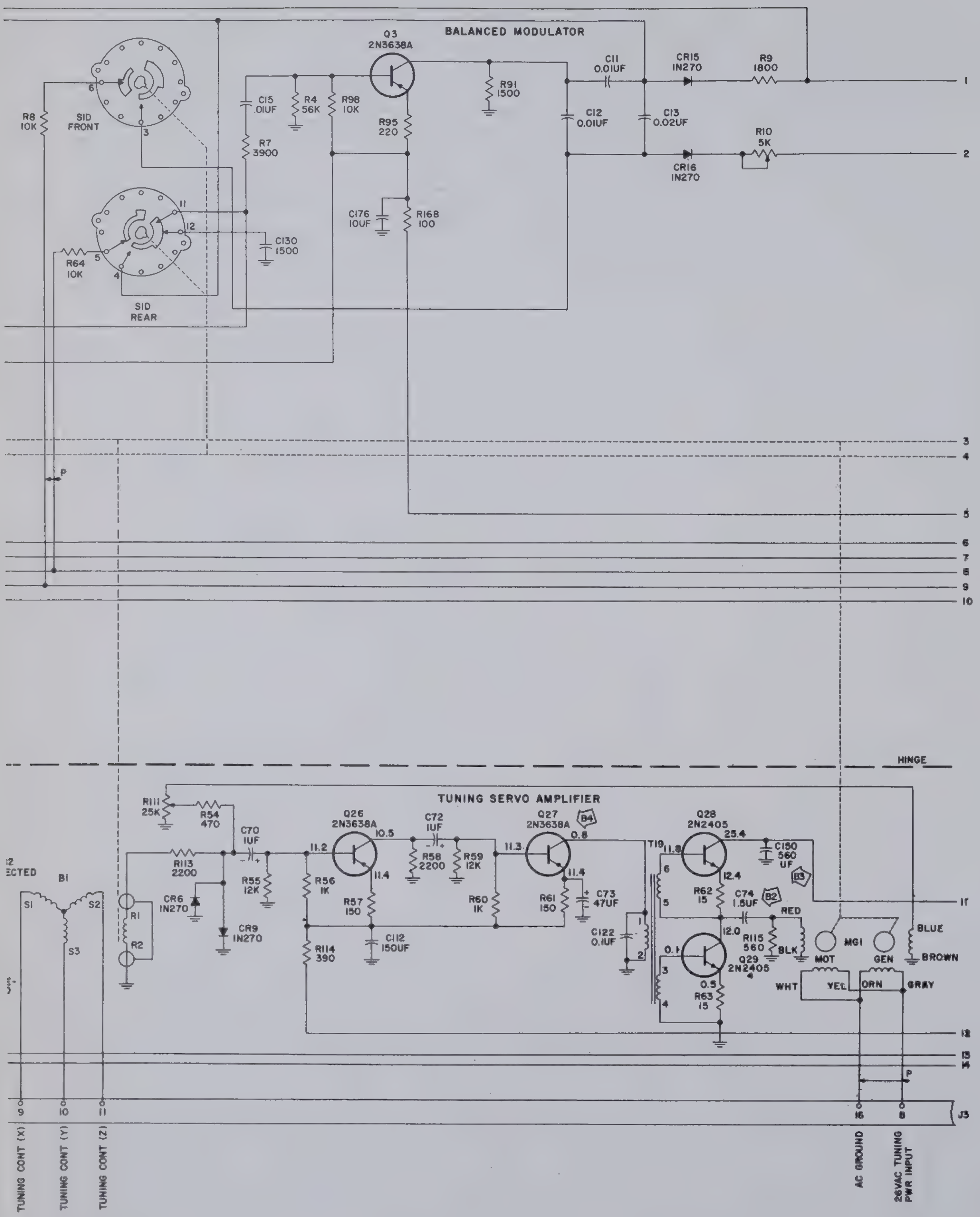
51Y-4 ADF Receiver, MCN 1688 and Above,
Schematic Diagram (Sheet 2 of 4)
Figure 813A

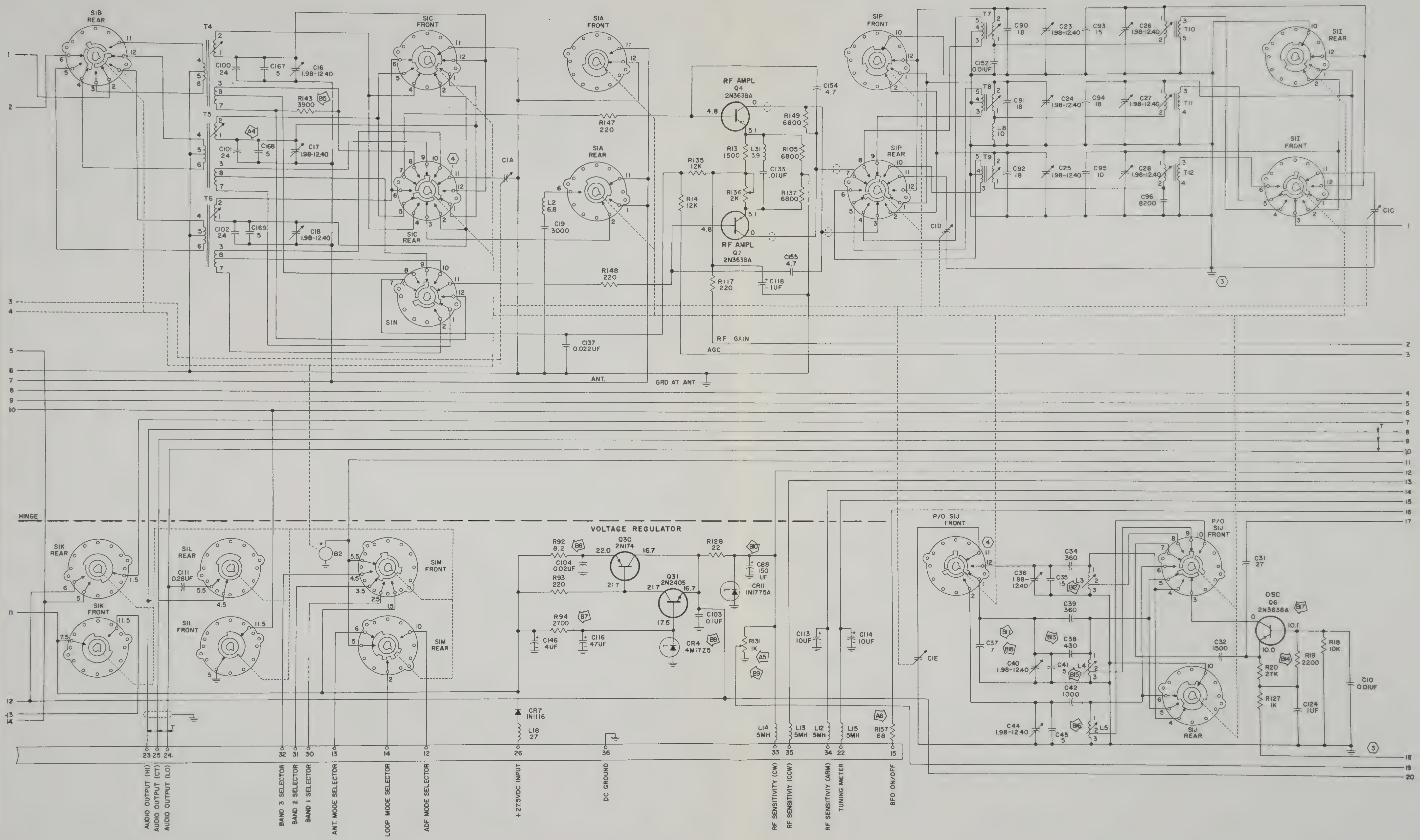


BALANCED MODULATOR
Q3
2N3638A
R91
1500
C11
0.01UF
CR15
1N270
R9
1800
1
C12
0.01UF
C13
0.02UF
R10
5K
CR16
1N270
2
C15
.01UF
R4
56K
R98
10K
R95
220
R7
3900
R8
10K
SID
FRONT
6
3
11
12
5
4
C176
10UF
R168
100
C130
1500
R64
10K
SID
REAR
3
4
P
5
6
7
8
9
10
HINGE
TUNING SERVO AMPLIFIER
R111
25K
R54
470
C70
1UF
R113
2200
Q26
2N3638A
11.2
10.5
11.4
C72
1UF
R58
2200
R59
12K
Q27
2N3638A
B4
11.3
0.8
11.4
Q28
2N2405
11.8
25.4
C150
560
UF
B3
T19
6
5
1
2
3
4
R55
12K
R56
1K
R57
150
R60
1K
R61
150
C73
47UF
R62
15
12.4
C74
1.5UF
B2
12.0
RED
R115
560
BLK
CR6
1N270
CR9
1N270
R1
R2
C112
150UF
R114
390
C122
0.1UF
0.1
Q29
2N2405
0.5
R63
15
MG1
MOT
GEN
BLUE
BROWN
WHT
YEL
ORN
GRAY
11
12
13
14
P
2
ECTED
B1
S1
S2
S3
9
10
11
16
8
J3
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING
PWR INPUT


S1B
REAR
T4
S1C
FRONT
S1A
FRONT
C100
24
C167
5
C16
1.98-12.40
R143
3900
B5
T5
A4
C101
24
C168
5
C17
1.98-12.40
R147
220
RF A
2N36
4.8
C1A
S1A
REAR
R135
12K
R13
1500
R14
12K
R136
2K
L2
6.8
C19
3000
S1C
REAR
T6
C102
24
C169
5
C18
1.98-12.40
RF A
2N36
R148
220
R117
220
S1N
C137
0.022UF
RF GA
AGC
ANT.
GRD AT ANT.
1
2
3
4
5
6
7
8
9
10
11
12
13
14
HINGE
VOLTAGE REGULATOR
S1K
REAR
S1L
REAR
C111
0.28UF
B2
S1M
FRONT
R92
8.2
B6
Q30
2N174
22.0
16.7
R128
22
C104
0.02UF
R93
220
21.7
Q31
2N2405
21.7
16.7
S1K
FRONT
S1L
FRONT
S1M
REAR
R94
2700
B7
C103
0.1UF
17.5
C146
4UF
C116
47UF
CR4
.4M17Z5
B8
CR7
1N1116
L18
27
T
23
25
24
32
31
30
13
14
12
26
36
AUDIO OUTPUT (HI)
AUDIO OUTPUT (CT)
AUDIO OUTPUT (LO)
BAND 3 SELECTOR
BAND 2 SELECTOR
BAND 1 SELECTOR
ANT. MODE SELECTOR
LOOP MODE SELECTOR
ADF MODE SELECTOR
+27.5VDC INPUT
DC GROUND

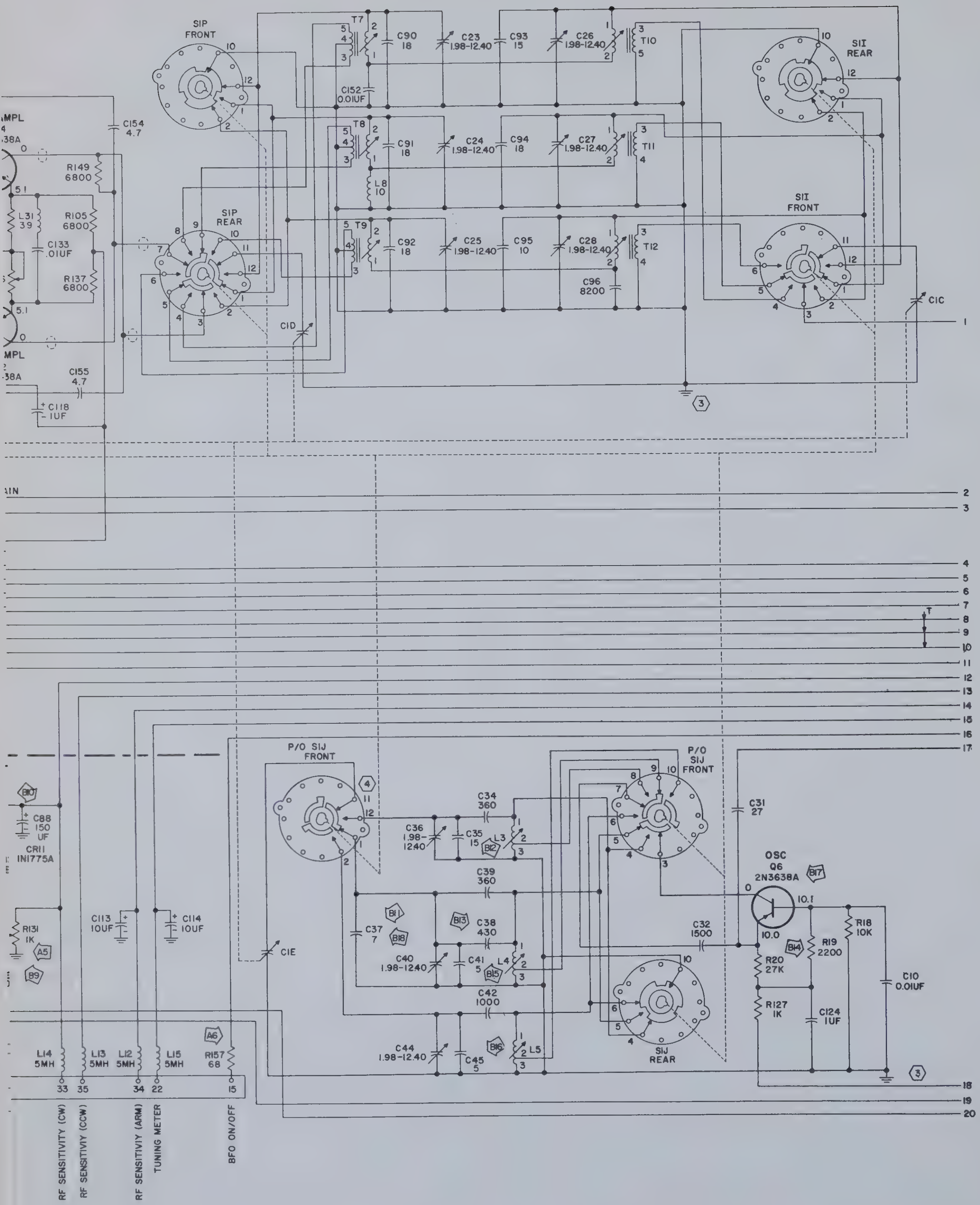
51Y-4 ADF Receiver, MCN 1688 and Above,
Schematic Diagram (Sheet 3 of 4)
Figure 813A

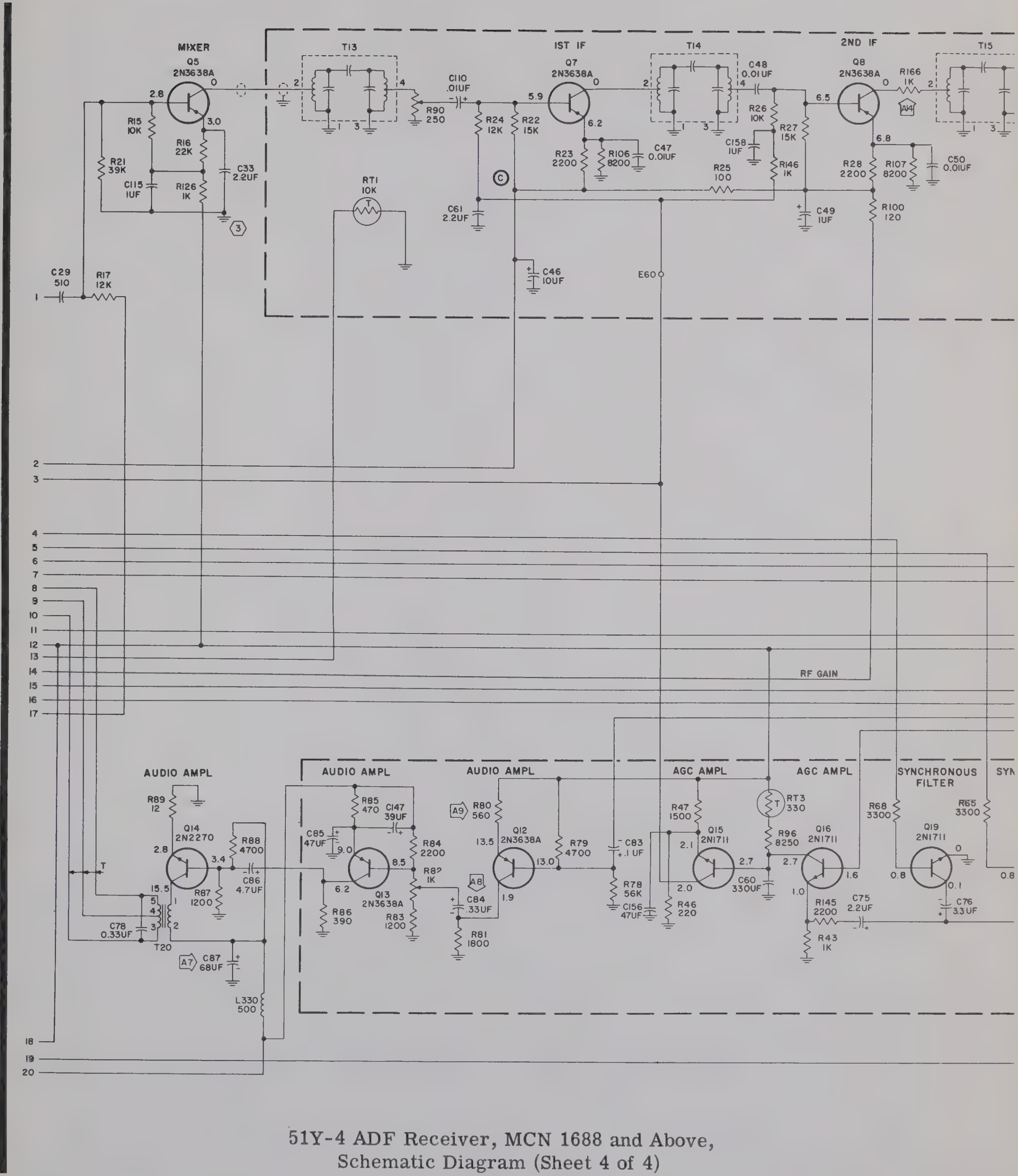

BALANCED MODULATOR
Q3
2N3638A
SID FRONT
SID REAR
R8 10K
R64 10K
C15 .01UF
R7 3900
R4 56K
R98 10K
R95 220
R91 1500
C176 10UF
R168 100
C130 1500
C11 0.01UF
C12 0.01UF
C13 0.02UF
CR15 1N270
CR16 1N270
R9 1800
R10 5K
6
3
11
12
5
4
P
1
2
3
4
5
6
7
8
9
10
HINGE
TUNING SERVO AMPLIFIER
R111 25K
R54 470
R113 2200
C70 1UF
CR6 1N270
CR9 1N270
R55 12K
R1
R2
Q26
2N3638A
11.2
10.5
11.4
R56 1K
R57 150
R114 390
C112 150UF
C72 1UF
R58 2200
R59 12K
R60 1K
Q27
2N3638A
B4
11.3
0.8
11.4
R61 150
C73 47UF
T19
C122 0.1UF
1
2
3
4
5
6
Q28
2N2405
11.8
25.4
12.4
C150 560 UF
B3
R62 15
C74 1.5UF
B2
12.0
RED
R115 560
BLK
0.1
Q29
2N2405
0.5
R63 15
MG1
MOT
GEN
WHT
YEL
ORN
GRAY
BLUE
BROWN
11
12
13
14
P
B1
S1
S2
S3
ECTED
9
10
11
16
8
J3
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT


S1B REAR
T4
T5
T6
C100 24
C167 5
C16 1.98-12.40
C101 24
C168 5
C17 1.98-12.40
C102 24
C169 5
C18 1.98-12.40
R143 3900
S1C FRONT
S1C REAR
S1N
C1A
S1A FRONT
S1A REAR
R147 220
R148 220
L2 6.8
C19 3000
C137 0.022UF
RF AMPL Q4 2N3638A
RF AMPL Q2 2N3638A
R13 1500
L31 3.9
R135 12K
R14 12K
R136 2K
C133 .01UF
R105 6800
R137 6800
R149 6800
C154 4.7
C155 4.7
R117 220
C118 1UF
RF GAIN
AGC
ANT.
GRD AT ANT.
S1P FRONT
S1P REAR
C1D
T7
T8
T9
L8 10
C152 0.01UF
C90 18
C91 18
C92 18
C23 1.98-12.40
C24 1.98-12.40
C25 1.98-12.40
C93 15
C94 18
C95 10
C26 1.98-12.40
C27 1.98-12.40
C28 1.98-12.40
C96 8200
T10
T11
T12
S1I REAR
S1I FRONT
C1C
HINGE
S1K REAR
S1K FRONT
S1L REAR
S1L FRONT
C111 0.28UF
B2
S1M FRONT
S1M REAR
VOLTAGE REGULATOR
R92 8.2
Q30 2N174
C104 0.02UF
R93 220
Q31 2N2405
R94 2700
C146 4UF
C116 47UF
C103 0.1UF
CR4 4M1725
R128 22
C88 150 UF
CR11 1N1775A
R131 1K
C113 10UF
C114 10UF
CR7 1N1116
L18 27
L14 5MH
L13 5MH
L12 5MH
L15 5MH
R157 68
P/O S1J FRONT
P/O S1J FRONT
C1E
C34 360
C36 1.98-1240
C35 15
L3
C39 360
C37 7
C38 430
C40 1.98-1240
C41 5
L4
C42 1000
C44 1.98-1240
C45 5
L5
C31 27
OSC Q6 2N3638A
C32 1500
R20 27K
R19 2200
R18 10K
R127 1K
C124 1UF
C10 0.01UF
S1J REAR
AUDIO OUTPUT (HI)
AUDIO OUTPUT (CT)
AUDIO OUTPUT (LO)
BAND 3 SELECTOR
BAND 2 SELECTOR
BAND 1 SELECTOR
ANT. MODE SELECTOR
LOOP MODE SELECTOR
ADF MODE SELECTOR
+27.5VDC INPUT
DC GROUND
RF SENSITIVITY (CW)
RF SENSITIVIY (CCW)
RF SENSITIVIY (ARM)
TUNING METER
BFO ON/OFF

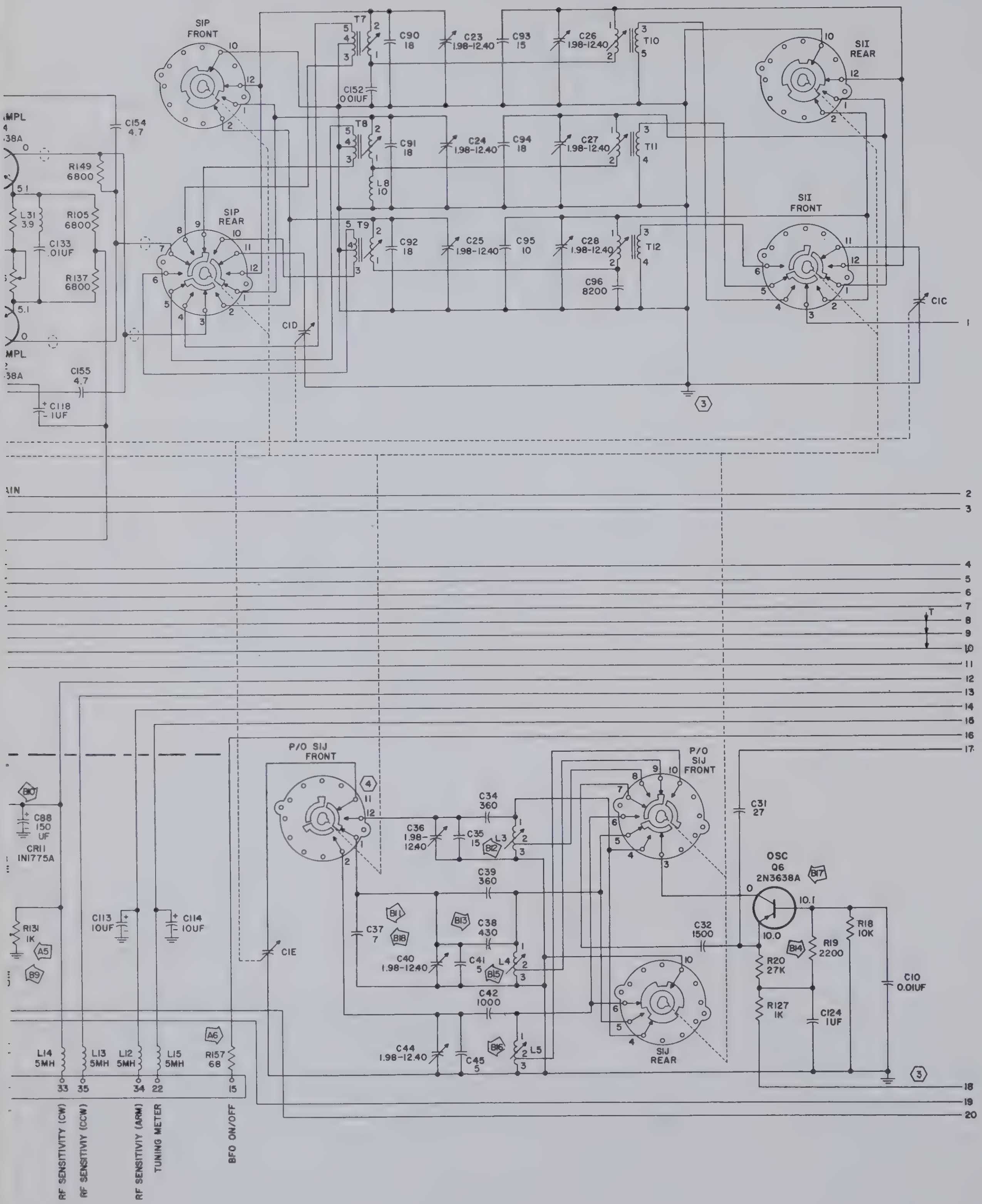
April 15/69

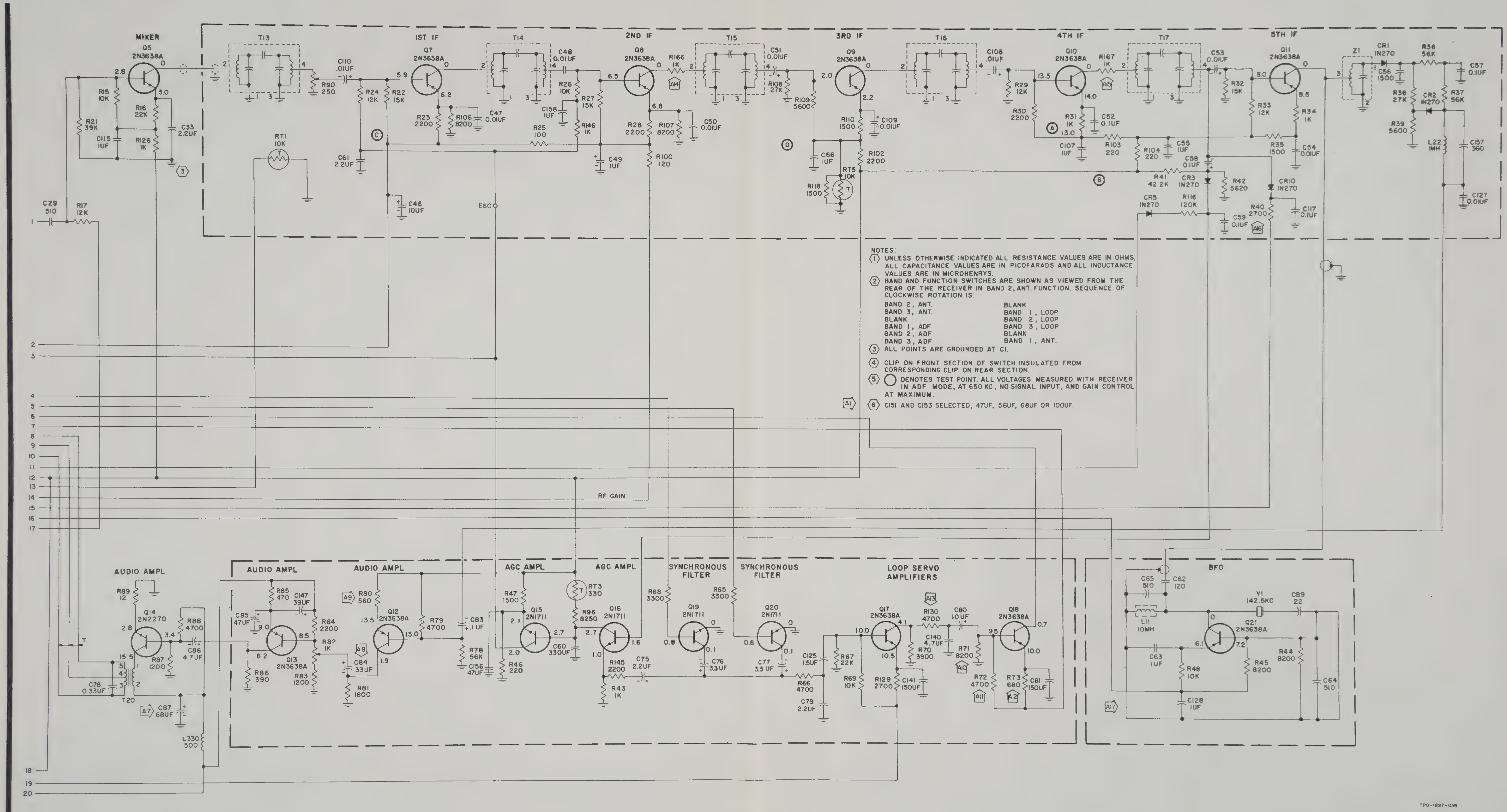
51Y-4 ADF Receiver, MCN 1688 and Above,
Schematic Diagram (Sheet 3 of 4)
Figure 813A


SIP FRONT
SIP REAR
SII REAR
SII FRONT
T7
T8
T9
T10
T11
T12
C90 18
C91 18
C92 18
C23 1.98-12.40
C24 1.98-12.40
C25 1.98-12.40
C93 15
C94 18
C95 10
C26 1.98-12.40
C27 1.98-12.40
C28 1.98-12.40
C152 0.01UF
L8 10
C96 8200
C1D
C1C
C154 4.7
R149 6800
L31 39
R105 6800
C133 .01UF
R137 6800
C155 4.7
C118 1UF
MPL
38A
AIN
P/O SIJ FRONT
SIJ REAR
C34 360
C36 1.98-1240
C35 15
L3
C39 360
C37 7
C38 430
C40 1.98-1240
C41 5
L4
C42 1000
C44 1.98-12.40
C45 5
L5
C1E
C31 27
C32 1500
OSC Q6 2N3638A
R18 10K
R19 2200
R20 27K
R127 1K
C124 1UF
C10 0.01UF
C88 150 UF
CR11 1N1775A
R131 1K
C113 10UF
C114 10UF
L14 5MH
L13 5MH
L12 5MH
L15 5MH
R157 68
B10
B11
B12
B13
B14
B15
B16
B17
B18
A5
A6
B9
3
4
33
35
34
22
15
RF SENSITIVITY (CW)
RF SENSITIVIY (CCW)
RF SENSITIVIY (ARM)
TUNING METER
BFO ON/OFF
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
T


MIXER
Q5
2N3638A
T13
1ST IF
Q7
2N3638A
T14
2ND IF
Q8
2N3638A
T15
C110 .01UF
R90 250
R24 12K
R22 15K
R15 10K
R16 22K
R21 39K
C115 1UF
R126 1K
C33 2.2UF
RT1 10K
C61 2.2UF
C46 10UF
R23 2200
R106 8200
C47 0.01UF
C48 0.01UF
R26 10K
R27 15K
C158 1UF
R146 1K
R25 100
C49 1UF
R166 1K
R28 2200
R107 8200
C50 0.01UF
R100 120
C29 510
R17 12K
E60
RF GAIN
AUDIO AMPL
Q14
2N2270
R89 12
R88 4700
R87 1200
C86 4.7UF
C78 0.33UF
T20
C87 68UF
L330 500
Q13
2N3638A
R85 470
C147 39UF
C85 47UF
R84 2200
R82 1K
R86 390
R83 1200
Q12
2N3638A
R80 560
C84 .33UF
R81 1800
R79 4700
AGC AMPL
Q15
2N1711
R47 1500
C83 .1 UF
R78 56K
C156 47UF
R46 220
C60 330UF
RT3 330
R96 8250
Q16
2N1711
R145 2200
R43 1K
C75 2.2UF
SYNCHRONOUS FILTER
Q19
2N1711
R68 3300
R65 3300
C76 3.3UF
A7
A8
A9
A14

51Y-4 ADF Receiver, MCN 1688 and Above,
Schematic Diagram (Sheet 4 of 4)
Figure 813A


SIP FRONT
SIP REAR
T7
C90 18
C23 1.98-12.40
C93 15
C26 1.98-12.40
T10
SII REAR
C152 .001UF
C154 4.7
T8
C91 18
C24 1.98-12.40
C94 18
C27 1.98-12.40
T11
L8 10
R149 6800
L31 3.9
R105 6800
C133 .01UF
R137 6800
T9
C92 18
C25 1.98-12.40
C95 10
C28 1.98-12.40
T12
C96 8200
SII FRONT
C1C
C1D
C155 4.7
C118 1UF
MPL
38A
AIN
P/O SIJ FRONT
C34 360
C36 1.98-1240
C35 15
L3
C39 360
C37 7
C38 430
C40 1.98-1240
C41 5
L4
C42 1000
C44 1.98-12.40
C45 5
L5
C1E
P/O SIJ FRONT
SIJ REAR
C31 27
C32 1500
OSC Q6 2N3638A
R18 10K
R19 2200
R20 27K
R127 1K
C124 1UF
C10 0.01UF
C88 150 UF
CR11 1N1775A
R131 1K
C113 10UF
C114 10UF
L14 5MH
L13 5MH
L12 5MH
L15 5MH
R157 68
B10
B11
B12
B13
B14
B15
B16
B17
B18
A5
A6
B9
3
4
33
35
34
22
15
RF SENSITIVITY (CW)
RF SENSITIVIY (CCW)
RF SENSITIVIY (ARM)
TUNING METER
BFO ON/OFF
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
T


MIXER
Q5 2N3638A
1ST IF
Q7 2N3638A
2ND IF
Q8 2N3638A
3RD IF
Q9 2N3638A
4TH IF
Q10 2N3638A
5TH IF
Q11 2N3638A
T13
T14
T15
T16
T17
Z1
CR1 IN270
CR2 IN270
CR3 IN270
CR5 IN270
CR10 IN270
RT1 10K
RT5 10K
RT3 330
Y1 142.5KC
L11 10MH
L22 1MH
L330 500
T20
E60
RF GAIN
AUDIO AMPL
Q14 2N2270
AUDIO AMPL
Q13 2N3638A
AUDIO AMPL
Q12 2N3638A
AGC AMPL
Q15 2N1711
AGC AMPL
Q16 2N1711
SYNCHRONOUS FILTER
Q19 2N1711
SYNCHRONOUS FILTER
Q20 2N1711
LOOP SERVO AMPLIFIERS
Q17 2N3638A
Q18 2N3638A
BFO
Q21 2N3638A
TPO-1897-038

NOTES:

① UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

② BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:

BAND 2, ANT.
BAND 3, ANT.
BLANK
BAND 1, ADF
BAND 2, ADF
BAND 3, ADF
BLANK
BAND 1, LOOP
BAND 2, LOOP
BAND 3, LOOP
BLANK
BAND 1, ANT.

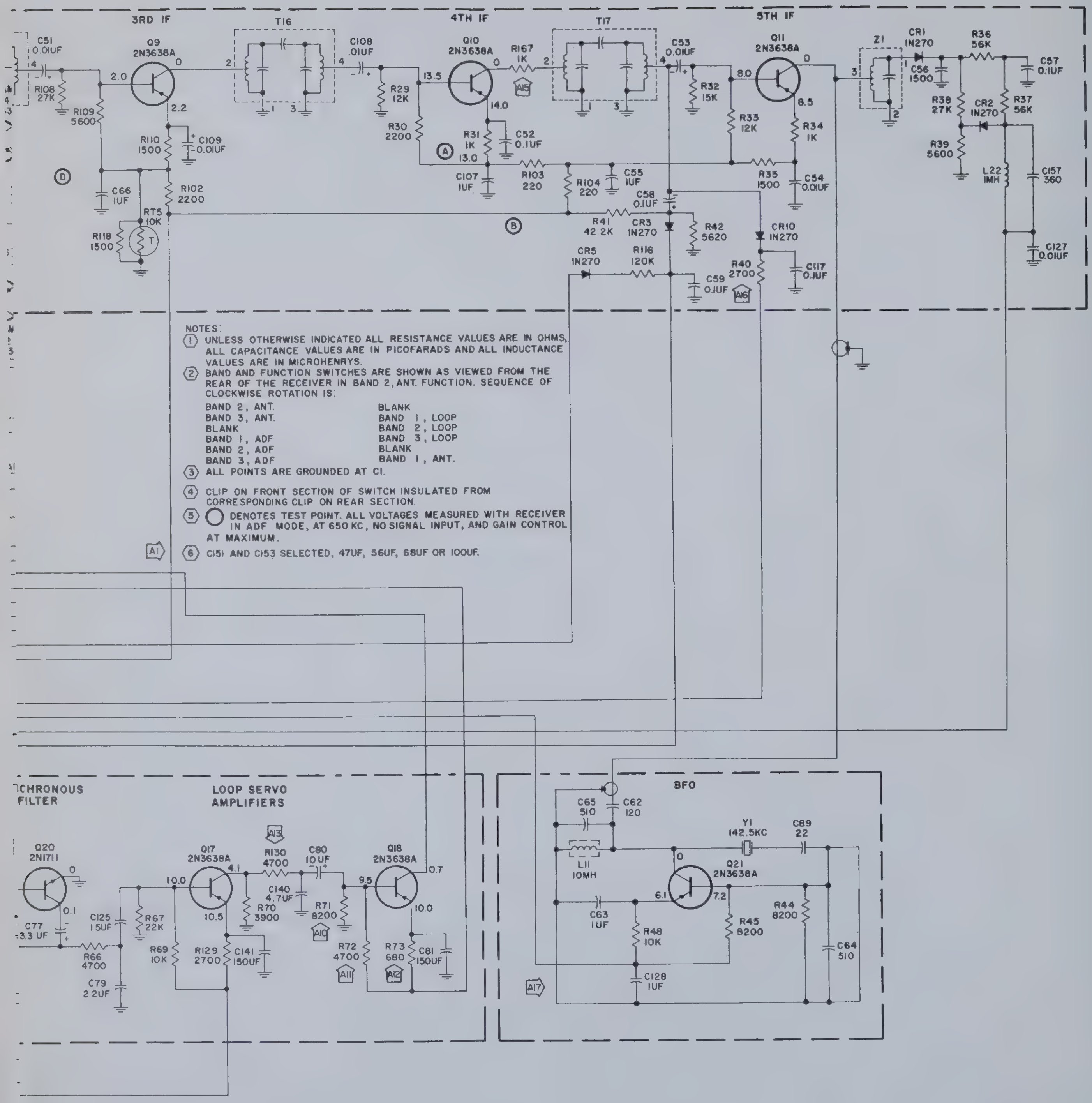
③ ALL POINTS ARE GROUNDED AT C1.

④ CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.

⑤ ○ DENOTES TEST POINT. ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650 KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.

⑥ C151 AND C153 SELECTED, 47UF, 56UF, 68UF OR 100UF.

51Y-4 ADF Receiver, MCN 1688 and Above,
Schematic Diagram (Sheet 4 of 4)
Figure 813A


3RD IF
C51
0.01UF
R108
27K
R109
5600
Q9
2N3638A
2.0
0
2.2
R110
1500
C109
0.01UF
R102
2200
C66
1UF
RT5
10K
R118
1500
T
D
T16
C108
.01UF
R29
12K
R30
2200
4TH IF
Q10
2N3638A
13.5
0
14.0
13.0
R167
1K
A15
R31
1K
C52
0.1UF
A
C107
1UF
R103
220
R104
220
C55
1UF
B
R41
42.2K
CR3
IN270
C58
0.1UF
R42
5620
CR5
IN270
R116
120K
C59
0.1UF
A16
T17
C53
0.01UF
R32
15K
5TH IF
Q11
2N3638A
8.0
0
8.5
R33
12K
R34
1K
R35
1500
C54
0.01UF
CR10
IN270
R40
2700
C117
0.1UF
Z1
CR1
IN270
C56
1500
R36
56K
C57
0.1UF
R38
27K
CR2
IN270
R37
56K
R39
5600
L22
1MH
C157
360
C127
0.01UF
A1
CHRONOUS
FILTER
Q20
2N1711
0
0.1
C77
3.3 UF
C125
15UF
R67
22K
R66
4700
C79
2.2UF
LOOP SERVO
AMPLIFIERS
A13
Q17
2N3638A
10.0
4.1
10.5
R69
10K
R129
2700
C141
150UF
R130
4700
C80
10UF
C140
4.7UF
R70
3900
R71
8200
A10
Q18
2N3638A
9.5
0.7
10.0
R72
4700
A11
R73
680
A12
C81
150UF
BFO
C65
510
C62
120
L11
10MH
Y1
142.5KC
C89
22
Q21
2N3638A
0
6.1
7.2
C63
1UF
R48
10K
R45
8200
R44
8200
C64
510
C128
1UF
A17
TPO-1897-038

NOTES:

① UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

② BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:

BAND 2, ANT.
BAND 3, ANT.
BLANK
BAND 1, ADF
BAND 2, ADF
BAND 3, ADF
BLANK
BAND 1, LOOP
BAND 2, LOOP
BAND 3, LOOP
BLANK
BAND 1, ANT.

③ ALL POINTS ARE GROUNDED AT C1.

④ CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.

⑤ ○ DENOTES TEST POINT. ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650 KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.

⑥ C151 AND C153 SELECTED, 47UF, 56UF, 68UF OR 100UF.

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	A1	Resistor R120 was 180; is changed to 1200.	Adjusted loop servo motor damping current.		MCN 20 through MCN 173.
3	A2	Capacitor C42 was 1200 pf; is changed to 620 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 164 and above.
3	A2	Capacitor C43 was 51 pf, is changed to 620 pf.	Same as above.		MCN 164 and above.
3	A2	Capacitor C129 is deleted.	Same as above.		MCN 164 and above.
3	A2	Capacitor C41 was 10 pf; is changed to 15 pf.	Same as above.		MCN 164 and above.
3	A2	Capacitor C39 was 120 pf; is changed to 360 pf.	Same as above.		MCN 164 and above.
3	A2	Capacitor C38 was 620 pf; is changed to 430 pf.	Same as above.		MCN 164 and above.
3	A2	Capacitor C7 was 150 pf; is changed to 100 pf.	Same as above.		MCN 164 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1A of 4)
Figure 814

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	(A2)	Capacitor C34 was 270 pf; is changed to 390 pf.	Improved temperature compensation and tracking of local oscillator.		MCN 164 and above.
3	(A2)	Capacitor C35 was 130 pf; is changed to 10 pf.	Same as above.		MCN 164 and above.
2	(A3)	Resistor R134 was 15K; is changed to 10K.	Corrected phase shift in loop rf stage.		MCN 174 and above.
2	(A3)	Capacitor C130 was 10 pf; is changed to 270 pf.	Same as above.		MCN 174 and above.
2	(A3)	Coil L17 was 1000 uh; is changed to 500 uh.	Same as above.		MCN 174 and above.
2	(A3)	Resistor R141 is added.	Same as above.		MCN 174 and above.
2	(A4)	Resistor R139 is deleted.	Simplified network supplying damping current for winding of servo motor B5.		MCN 174 and above.
2	(A4)	Resistor R122 was 10 ohms; is changed to 15 ohms.	Same as above.		MCN 174 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1B of 4)
Figure 814

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	A4	Capacitor C99 is deleted.	Simplified network supplying damping current for winding of servo motor B5.		MCN 174 and above.
2	A4	Resistor R119 is deleted.	Same as above.		MCN 174 and above.
2	A4	Capacitor C68 was 40 uf; is changed to 33 uf.	Same as above.		MCN 174 through MCN 727.
2	A4	Resistor R120 is deleted.	Same as above.		MCN 174 and above.
2	A4	Resistor R101 is deleted.	Same as above.		MCN 174 and above.
2	A4	Resistor R132 is deleted.	Same as above.		MCN 174 and above.
2	A4	Resistor R140 is deleted.	Same as above.		MCN 174 and above.
2 and 4	A5	Diode CR14 is deleted.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3).	MCN 174 and above.
2 and 4	A5	Resistor R74 was 33 ohms; is changed to 68 ohms.	Same as above.	Same as above.	MCN 174 through MCN 220.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1C of 4)
Figure 814

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	A5	Capacitor C125 was 100 uf; is changed to 1.5 uf.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3).	MCN 174 and above.
2 and 4	A5	Resistor R129 was 2200 ohms; is changed to 2700 ohms.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	A5	Resistor R66 was 10K; is changed to 4700 ohms.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	A5	Resistor R69 was 680 ohms; is changed to 10K.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	A5	Resistor R67 was 68K ohms; is changed to 22K.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	A5	Capacitor C79 was 10 uf; is changed to 2.2 uf.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	A5	Diode CR13 is deleted.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	A5	Diode CR12 is deleted.	Same as above.	Same as above.	MCN 174 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1D of 4)
Figure 814

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	(A5)	Resistor R130 was 10K; is changed to 1000 ohms.	Incorporated antihunt modification to eliminate bearing indicator hunting.	20 (also 614L-8 service bulletin 3).	MCN 174 and above.
2 and 4	(A5)	Capacitor C141 is added.	Same as above.	Same as above.	MCN 174 and above.
2 and 4	(A5)	Capacitor C140 is added (15 uf).	Same as above.	Same as above.	MCN 174 through MCN 178.
4	(A6)	Capacitor C140 was 15 uf; is changed to 10 uf.	Increased gain of loop servo amplifier.		MCN 179 through MCN 354.
3	(A7)	Capacitor C95 was 15 pf; is changed to 10 pf.	Adjusted tracking of band 3.		MCN 185 and above.
2 and 4	(A8)	Resistor R49 was 680 ohms; is changed to 1000 ohms.	Changed to silicon transistors for increased reliability and changed associated components to provide correct voltages for silicon transistors.	27	MCN 221 and above.
2 and 4	(A8)	Resistor R125 was 270 ohms; is changed to 150 ohms.	Same as above.	27	MCN 221 through MCN 761.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1E of 4)
Figure 814

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	A8	Resistor R124 was 820 ohms; is changed to 1500 ohms.	Changed to silicon transistors for increased reliability and changed associated components to provide correct voltages for silicon transistors.	27	MCN 221 and above.
2 and 4	A8	Transistor Q22 was 2N158A; is changed to 2N1131.	Same as above.	27	MCN 221 and above.
2 and 4	A8	Resistor R74 was 68 ohms; is changed to 330 ohms.	Same as above.	27	MCN 221 and above.
2 and 4	A8	Resistor R75 was 2200 ohms; is changed to 5600 ohms.	Same as above.	27	MCN 221 and above.
2 and 4	A8	Transistor Q24 was 2N158; is changed to 2N2405.	Same as above.	27	MCN 221 and above.
2 and 4	A8	Transistor Q25 was 2N158A; is changed to 2N2405.	Same as above.	27	MCN 221 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1F of 4)
Figure 814

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	A8	Transistor Q29 was 2N158A; is changed to 2N2405.	Changed to silicon transistors for increased reliability and changed associated components to provide correct voltages for silicon transistors.	27	MCN 221 and above.
2 and 4	A8	Transistor Q28 was 2N158A; is changed to 2N2405.	Same as above.	27	MCN 221 and above.
2 and 4	A8	Resistor R76 was 5.1 ohms; is changed to 15 ohms.	Same as above.	27	MCN 221 through MCN 714.
2 and 4	A8	Resistor R77 was 5.1 ohms; is changed to 15 ohms.	Same as above	27	MCN 221 through MCN 714.
2 and 4	A8	Transistor Q14 was 2N158A; is changed to 2N2270.	Same as above.	27	MCN 221 and above.
2 and 4	A8	Resistor R87 was 680 ohms; is changed to 1200 ohms.	Same as above.	27	MCN 221 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1G of 4)
Figure 814

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	A8	Capacitor C87 was 200 uf; is changed to 10 uf.	Changed to silicon transistors for increased reliability and changed associated components to provide correct voltages for silicon transistors.	27	MCN 221 and above.
2 and 4	A8	Resistor R88 was 120 ohms; is changed to 4700 ohms.	Same as above.	27	MCN 221 and above.
2 and 4	A8	Resistor R79 was 3900 ohms; is changed to 4700 ohms.	Same as above.	27	MCN 221 and above.
2 and 4	A8	Thermistor RT4 is deleted.	Same as above.	27	MCN 221 and above.
2	B1	Capacitor C122: 0.1 uf is changed to 0.11 uf.	Increased reliability.	21	MCN 173 and above.
4	B2	Capacitor C52: 1 uf is changed to 0.01 uf.	Offset increased if. gain caused by improved transistors.	23	MCN 234 and above.
4	B2	Capacitor C110: 520 pf is changed to 0.01 uf.	Same as above.	23	MCN 234 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1H of 4)
Figure 814

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	B2	Capacitor C108: 0.1 uf is changed to 0.01 uf.	Offset increased gain caused by improved transistors.	23	MCN 234 and above.
3	B3	Capacitor C137: 0.02 is changed to 0.022 uf.	Changed type of capacitor to increase reliability.		MCN 317 and above.
3	B4	Coil L7: 27 uh is changed to 39 uh.	Improved image rejection.		MCN 340 and above.
3	B4	Coil L8: 5.6 uh is changed to 10 uh.	Improved image rejection.		MCN 340 and above.
3	B4	Transformer T10: terminal 4 is changed to terminal 5.	Improved image rejection.		MCN 340 and above.
3	B4	Capacitor C93: 10 pf is changed to 15 pf.	Improved image rejection.		MCN 340 and above.
4	B5	Capacitor C140: 10 uf is changed to 2.2 uf.	Increased servo amplifier gain.		MCN 355 through MCN 714.
2 and 4	B6	Capacitor C123: 1 uf is changed to C146 4 uf.	Reduced 400-Hz hum in audio output.	25	MCN 344 and above.
2 and 4	B6	Capacitor C147 is added.	Same as above.	25	MCN 344 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1I of 4)
Figure 814

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2 and 4	B6	Capacitor C83: 10 uf is changed to 0.1 uf.	Reduce 400-Hz hum in audio output.	25	MCN 344 and above.
2 and 4	B6	Capacitor C13: 10 uf is changed to C113 and relocated.	Same as above.		All.
2	B7	Capacitor C148 is added.	Removed parasitic in loop servo amplifier.		MCN 497 and above.
4	B8	Resistor R145 is added.	Improved matching between agc amplifier and synchronous filter.		MCN 701 and above.
4	B9	Capacitor C46 is added.	Corrected drawing.		All.
4	B10	All revision information was added to the schematic diagram.	This information aids users in correcting the 51Y-4A schematic to reflect both manufacturing and field revisions. This information was transferred from the cover letter to the schematic for user convenience.		MCN 20 to MCN 701.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1J of 4)
Figure 814

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	B11	Resistor R80 560 ohms is changed to 820 ohms.	Increase audio gain.		MCN 230 and above.
3	B12	Capacitor C145 was added.	Reduce 400 Hz hum in audio output.		MCN 317 through MCN 344.
3	B13	Capacitor C145 is deleted.	Capacitors C145 and C123 were replaced by capacitor C146.		MCN 345 and above.
3	B14	Capacitor C133, 0.01 is changed to 0.011 uf.	Increased reliability.		MCN 325 and above.
2	C1	Changed resolver B3 and revised B3 symbol to clarify drawing.			MCN 636 and above.
2	C2	C97 was 15 pf; C98 was 18 pf, changed C97 and C98 to 20 pf for product improvement.			MCN 777 and above.
2, 3, and 4	C3	Added polarities to C46 and C49. Added ground connections to Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, and Q21. Changed shielded wire symbols, and note 3 reference. Added gear train symbol to B5. Corrected drawing errors as follows: R97 was shown as 2.7K, CR4 and CR11 symbol change, renumbered terminals on T10, 1 was 2, 2 was 1, 3 was 5, and 5 was 3. R7 was 311, changed to 316.			All.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1K of 4)
Figure 814

51Y-4A ONLY

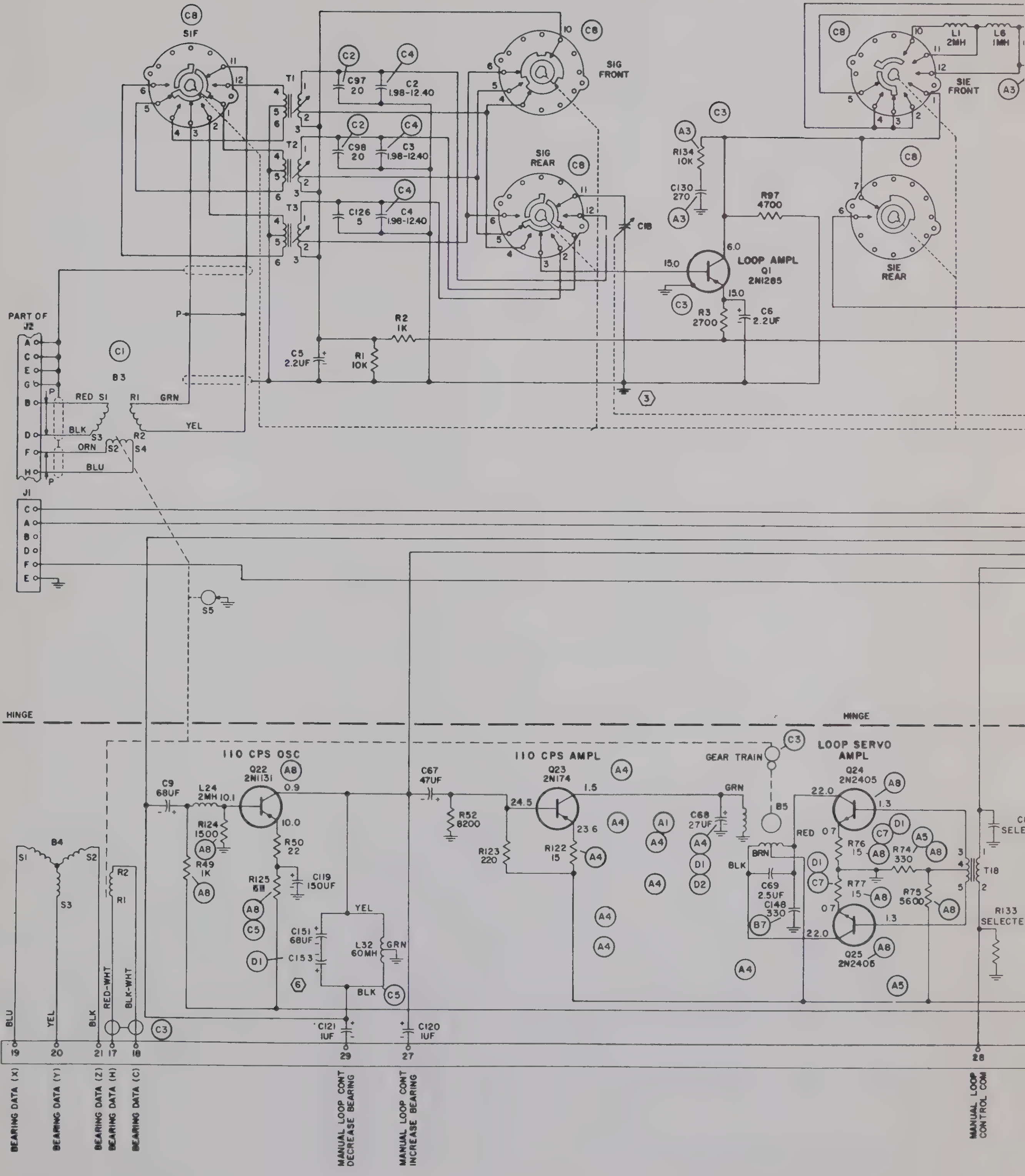
SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY
2 and 3	C4	C2, C3, C4, C16, C17, C18, C23, C24, C25, C26, C27, C28, C36, C40, and C44 were 1.3 pf-13 pf, changed to 1.98 pf-12.40 pf to correct drawing error.		All.
2	C5	Deleted Z2 and added L31, C151 and C153 for product improvement.		MCN 762 and above.
2	C5	R125 was 150 ohms; is changed to 68 ohms to provide correct voltage for silicon transistor.		MCN 762 and above.
2	C6	Added lead color designation, and changed B4 type for product improvement.		MCN 749 and above.
2	C7	R76 and R77 were 15 ohms changed to 22 ohms to redistribute gain in loop servo amplifier.		MCN 715 through MCN 761.
2 and 3	C8	Added numbers to all rotary switch contacts to clarify drawing.		All.
2	C9	Added C150, 330 uf to Q28 collector to eliminate oscillations in tuning servo.		MCN 650 and above.
3	C10	Q31 was 2N341, changed to 2N2405 for product improvement.		MCN 730 and above.
3	C11	C35 was 10 pf, changed to 2 pf to improve tracking.		
3	C12	Deleted L7, 39 mh and added C152, 3900 pf to improve image rejection.		MCN 718 and above.
4	C13	C76 and C77 were 3 uf, changed to 3.3 uf for product improvement.		MCN 715 and above.

51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1L of 4)
Figure 814

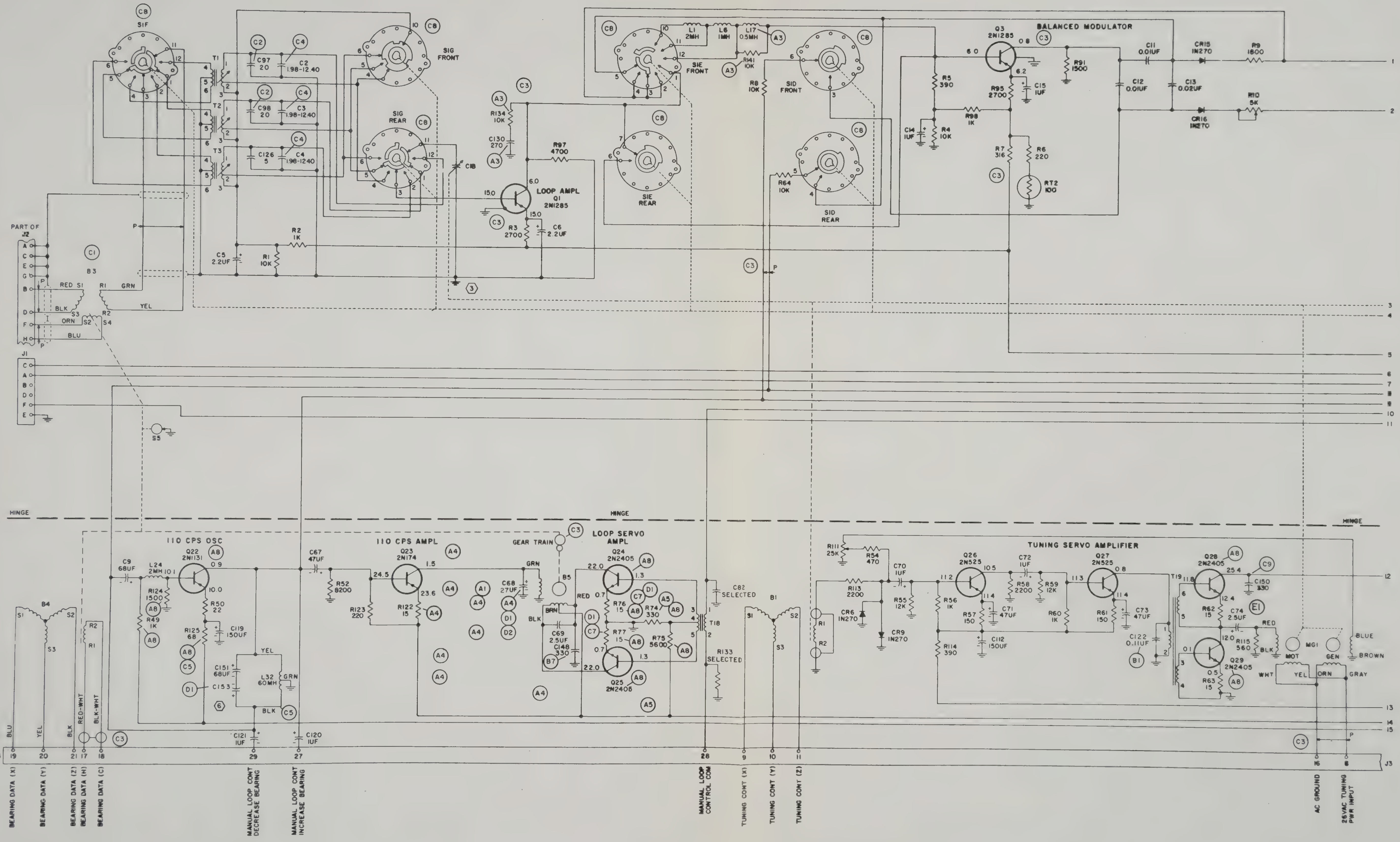
51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE	SERVICE BULLETIN	EFFECTIVITY
4	C14	C140 was 2.2 uf, changed to .47 uf to redistribute gain in servo loop amplifier.		MCN 715 through MCN 727.
3	C15	C133 was 0.011 uf, changed to 0.01 uf for product improvement.		MCN 730 and above.
2	D1	C153 was 47 uf, now selected in final manufacturing test from 47 uf or 68 uf to compensate for component variations in 110 Hz oscillator circuitry.		MCN 762 and above.
2	D1	R76 and R77 were 22 ohms; are changed to 15 ohms to improve loop phasing.		MCN 762 and above.
4	D1	C140 was .47 uf; is changed to 2.2 uf to improve loop phasing.		MCN 728 through MCN 1083.
2	D1	C68 was 33 uf; is changed to 22 uf to improve loop phasing.		MCN 174 through MCN 727.
2	D2	C68 was 22 uf; is changed to 27 uf to improve bearing speed.		MCN 728 and above.
2	E1	Changed transistors Q28 and Q29 from type pnp to type npn to correct schematic error.		All units.

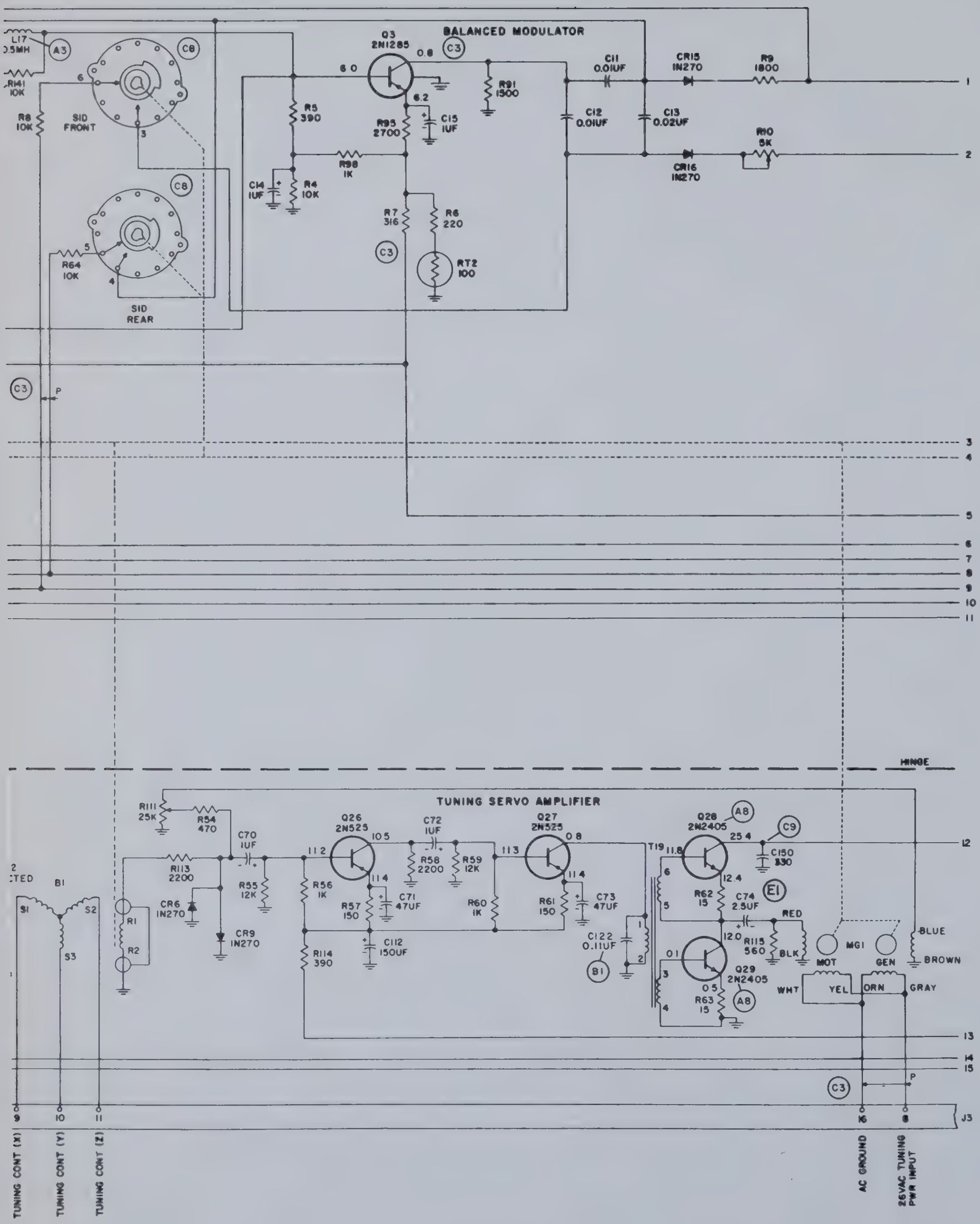
51Y-4A ADF Receiver, Through MCN 1083, Schematic Diagram (Sheet 1M of 4)
Figure 814

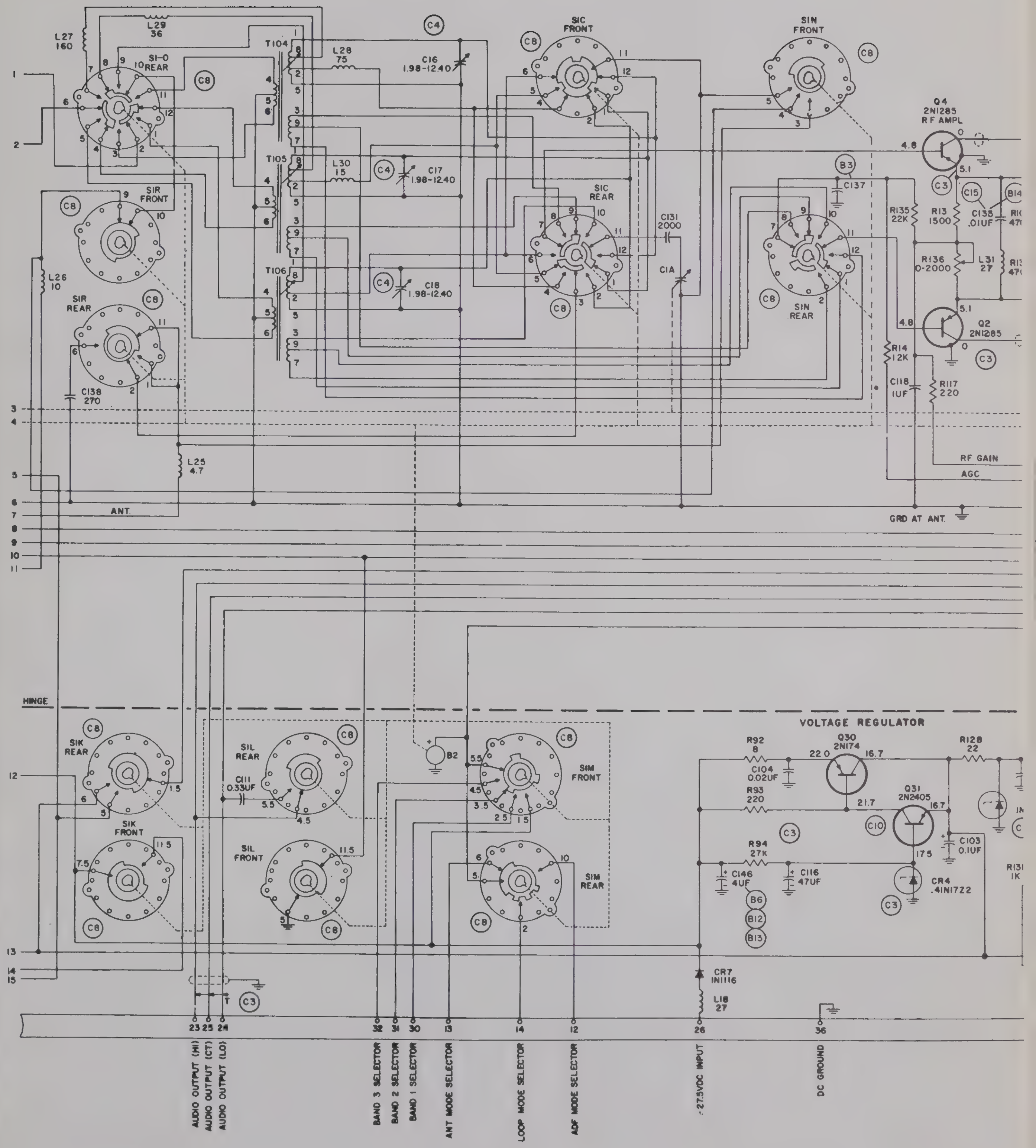

S1F
SIG FRONT
SIG REAR
SIE FRONT
SIE REAR
T1
T2
T3
C97 20
C2 1.98-12.40
C98 20
C3 1.98-12.40
C126 5
C4 1.98-12.40
C18
R134 10K
C130 270
R97 4700
LOOP AMPL Q1 2N1285
R3 2700
C6 2.2UF
R2 1K
R1 10K
C5 2.2UF
L1 2MH
L6 1MH
PART OF J2
B3
RED S1
R1 GRN
BLK S3
ORN S2 S4
R2
YEL
BLU
J1
S5
HINGE
110 CPS OSC
Q22 2N1131
C9 68UF
L24 2MH
R124 1500
R49 1K
R50 22
R125 5Ω
C119 150UF
C151 68UF
C153
L32 60MH
C67 47UF
R52 8200
110 CPS AMPL
Q23 2N174
R123 220
R122 15
C68 27UF
GEAR TRAIN
B5
LOOP SERVO AMPL
Q24 2N2405
Q25 2N2405
C69 2.5UF
C148 330
R76 15
R74 330
R77 15
R75 5600
T18
R133 SELECTE
B4
C121 1UF
C120 1UF
J3
BEARING DATA (X)
BEARING DATA (Y)
BEARING DATA (Z)
BEARING DATA (H)
BEARING DATA (C)
MANUAL LOOP CONT DECREASE BEARING
MANUAL LOOP CONT INCREASE BEARING
MANUAL LOOP CONTROL COM

51Y-4A ADF Receiver, Through MCN 1083,
Schematic Diagram, (Sheet 2 of 4)
Figure 814

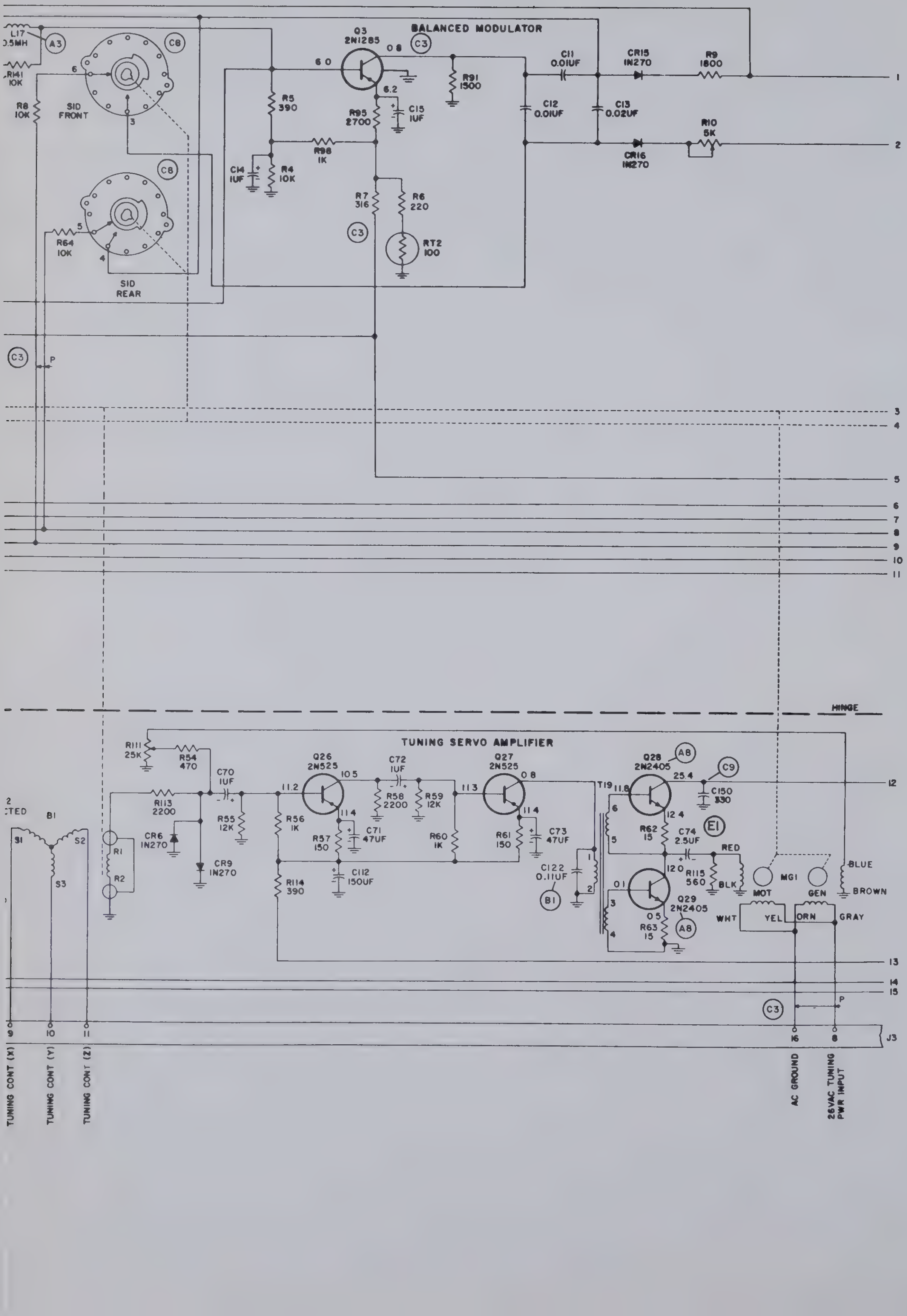

S1F
SIG FRONT
SIG REAR
T1
T2
T3
C97 20
C2 1.98-12.40
C98 20
C3 1.98-1240
C126 5
C4 1.98-1240
C5 2.2UF
R1 10K
R2 1K
PART OF J2
B3
RED
BLK
ORN
BLU
GRN
YEL
J1
S5
LOOP AMPL
Q1 2N1285
R134 10K
C130 270
R97 4700
R3 2700
C6 2.2UF
C18
S1E FRONT
S1E REAR
S1D FRONT
S1D REAR
L1 2MH
L6 1MH
L17 0.5MH
R141 10K
R8 10K
R64 10K
BALANCED MODULATOR
Q3 2N1285
R5 390
R4 10K
C14 1UF
R98 1K
R95 2700
C15 1UF
R91 1500
R7 316
R6 220
RT2 100
C11 0.01UF
C12 0.01UF
C13 0.02UF
CR15 IN270
CR16 IN270
R9 1800
R10 5K
HINGE
110 CPS OSC
Q22 2N1131
C9 68UF
L24 2MH
R124 1500
R49 1K
R50 22
R125 68
C119 150UF
C151 68UF
C153
L32 60MH
110 CPS AMPL
Q23 2N174
C67 47UF
R52 8200
R123 220
R122 15
GEAR TRAIN
B5
LOOP SERVO AMPL
Q24 2N2405
Q25 2N2405
C68 27UF
C69 2.5UF
C148 330
R76 15
R77 15
R74 330
R75 5600
T18
C82 SELECTED
R133 SELECTED
B4
B1
TUNING SERVO AMPLIFIER
R111 25K
R54 470
R113 2200
CR6 IN270
CR9 IN270
C70 1UF
R55 12K
Q26 2N525
R56 1K
R57 150
C71 47UF
C112 150UF
R114 390
C72 1UF
R58 2200
R59 12K
R60 1K
Q27 2N525
R61 150
C73 47UF
C122 0.11UF
T19
Q28 2N2405
Q29 2N2405
C150 330
R62 15
C74 2.5UF
R115 560
R63 15
MG1
MOT
GEN
BLUE
BROWN
WHT
GRAY
J3
BEARING DATA (X)
BEARING DATA (Y)
BEARING DATA (Z)
BEARING DATA (H)
BEARING DATA (C)
MANUAL LOOP CONT DECREASE BEARING
MANUAL LOOP CONT INCREASE BEARING
MANUAL LOOP CONTROL COM
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT

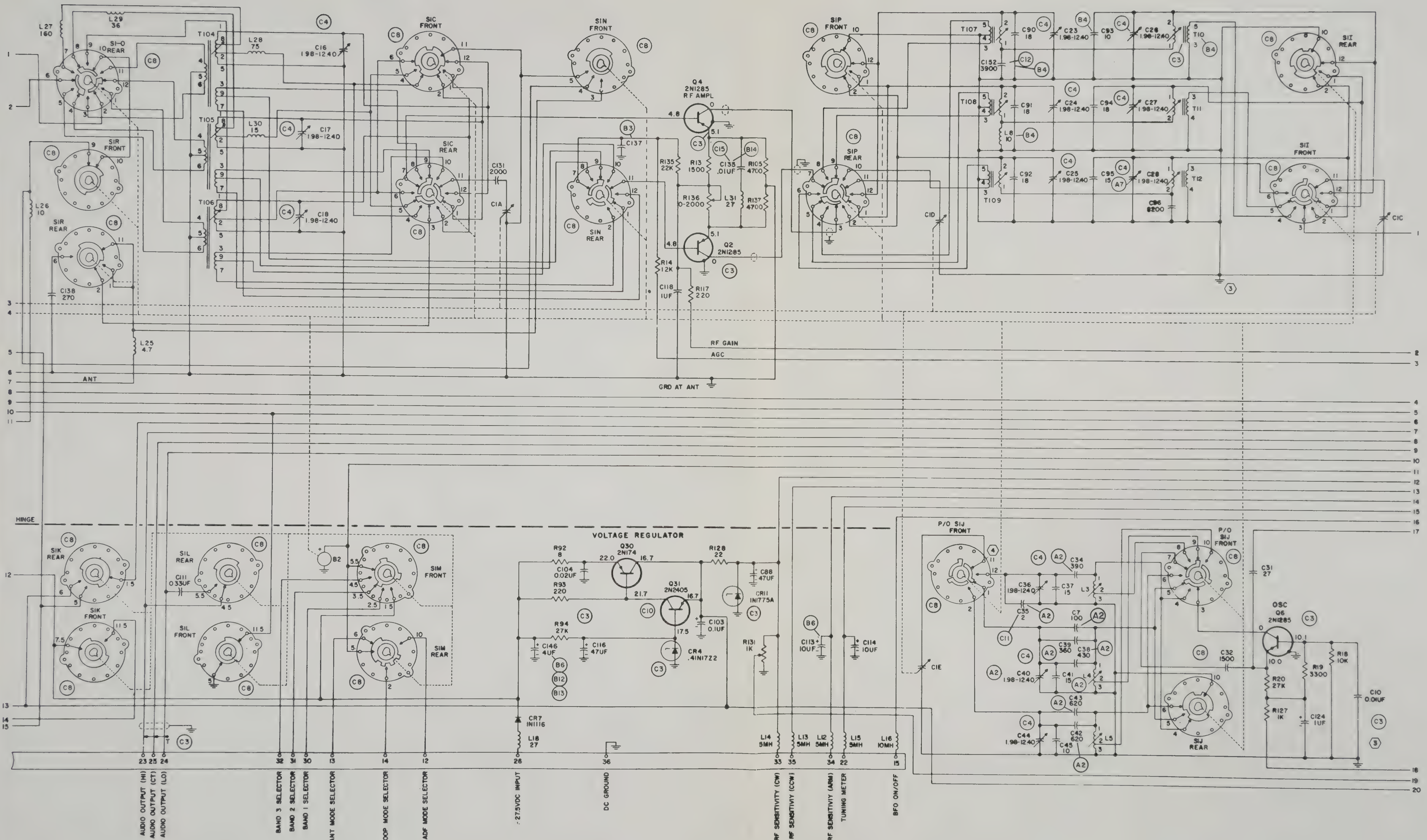
51Y-4A ADF Receiver, Through MCN 1083,
Schematic Diagram, (Sheet 2 of 4)
Figure 814


BALANCED MODULATOR
L17
.5MH
A3
C8
6
.R141
10K
R8
10K
S1D
FRONT
3
C8
R64
10K
5
4
S1D
REAR
Q3
2N1285
C3
6.0
0.8
6.2
R5
390
R95
2700
C15
1UF
R91
1500
C14
1UF
R4
10K
R98
1K
R7
316
R6
220
C3
RT2
100
C11
0.01UF
C12
0.01UF
C13
0.02UF
CR15
1N270
CR16
1N270
R9
1800
R10
5K
1
2
C3
P
3
4
5
6
7
8
9
10
11
HINGE
TUNING SERVO AMPLIFIER
R111
25K
R54
470
C70
1UF
R113
2200
CR6
1N270
CR9
1N270
R1
R2
2
.CTED
B1
S1
S2
S3
Q26
2N525
11.2
10.5
11.4
R55
12K
R56
1K
R57
150
C71
47UF
C112
150UF
R114
390
C72
1UF
R58
2200
R59
12K
R60
1K
Q27
2N525
11.3
0.8
11.4
R61
150
C73
47UF
C122
0.11UF
B1
T19
6
5
1
2
3
4
Q28
2N2405
A8
11.8
25.4
C9
C150
330
12.4
R62
15
C74
2.5UF
E1
12.0
RED
R115
560
BLK
0.1
Q29
2N2405
0.5
R63
15
A8
MG1
MOT
GEN
WHT
YEL
ORN
GRAY
BLUE
BROWN
12
13
14
15
C3
P
9
10
11
16
8
J3
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT

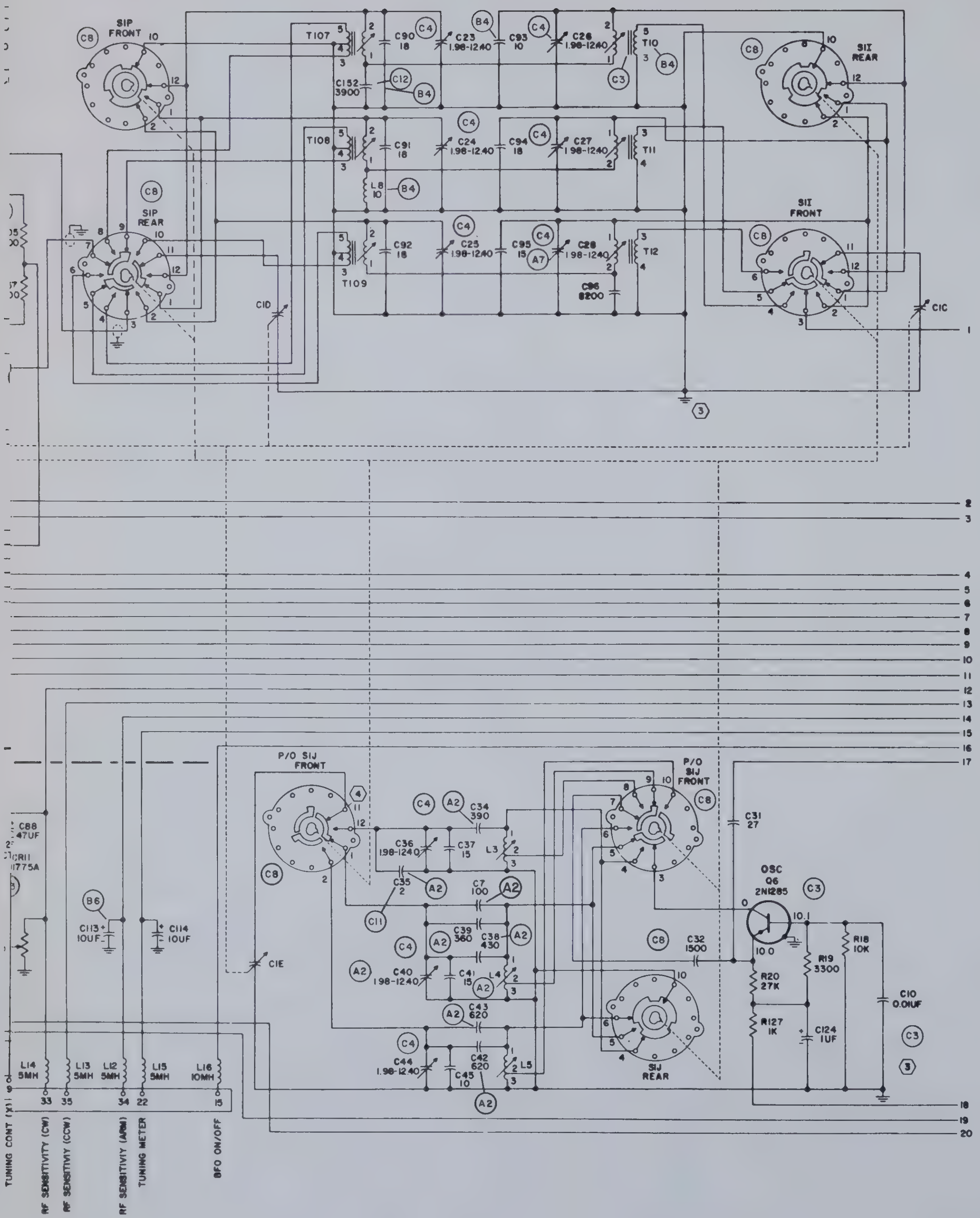

L29 36
L27 160
S1-0 REAR
T104
L28 75
C4
C16 1.98-12.40
S1C FRONT
S1N FRONT
C8
Q4 2N1285 RF AMPL
4.8
5.1
C3
T105
L30 15
C17 1.98-12.40
S1R FRONT
S1C REAR
C131 2000
C1A
B3
C137
R135 22K
R13 1500
C15
C138 .01UF
B14
R136 0-2000
L31 27
S1N REAR
L26 10
S1R REAR
T106
C18 1.98-12.40
Q2 2N1285
R14 12K
C118 1UF
R117 220
C138 270
L25 4.7
RF GAIN
AGC
ANT.
GRD AT ANT.
HINGE
S1K REAR
S1K FRONT
S1L REAR
C111 0.33UF
S1L FRONT
B2
S1M FRONT
S1M REAR
VOLTAGE REGULATOR
R92 8
C104 0.02UF
Q30 2N174
22.0
16.7
R93 220
21.7
Q31 2N2405
C10
C103 0.1UF
R94 27K
C146 4UF
C116 47UF
17.5
CR4 .41N1722
B6
B12
B13
R128 22
CR7 1N1116
L18 27
23 25 24
AUDIO OUTPUT (HI)
AUDIO OUTPUT (CT)
AUDIO OUTPUT (LO)
32 31 30
BAND 3 SELECTOR
BAND 2 SELECTOR
BAND 1 SELECTOR
13
ANT MODE SELECTOR
14
LOOP MODE SELECTOR
12
ADF MODE SELECTOR
26
+27.5VDC INPUT
36
DC GROUND

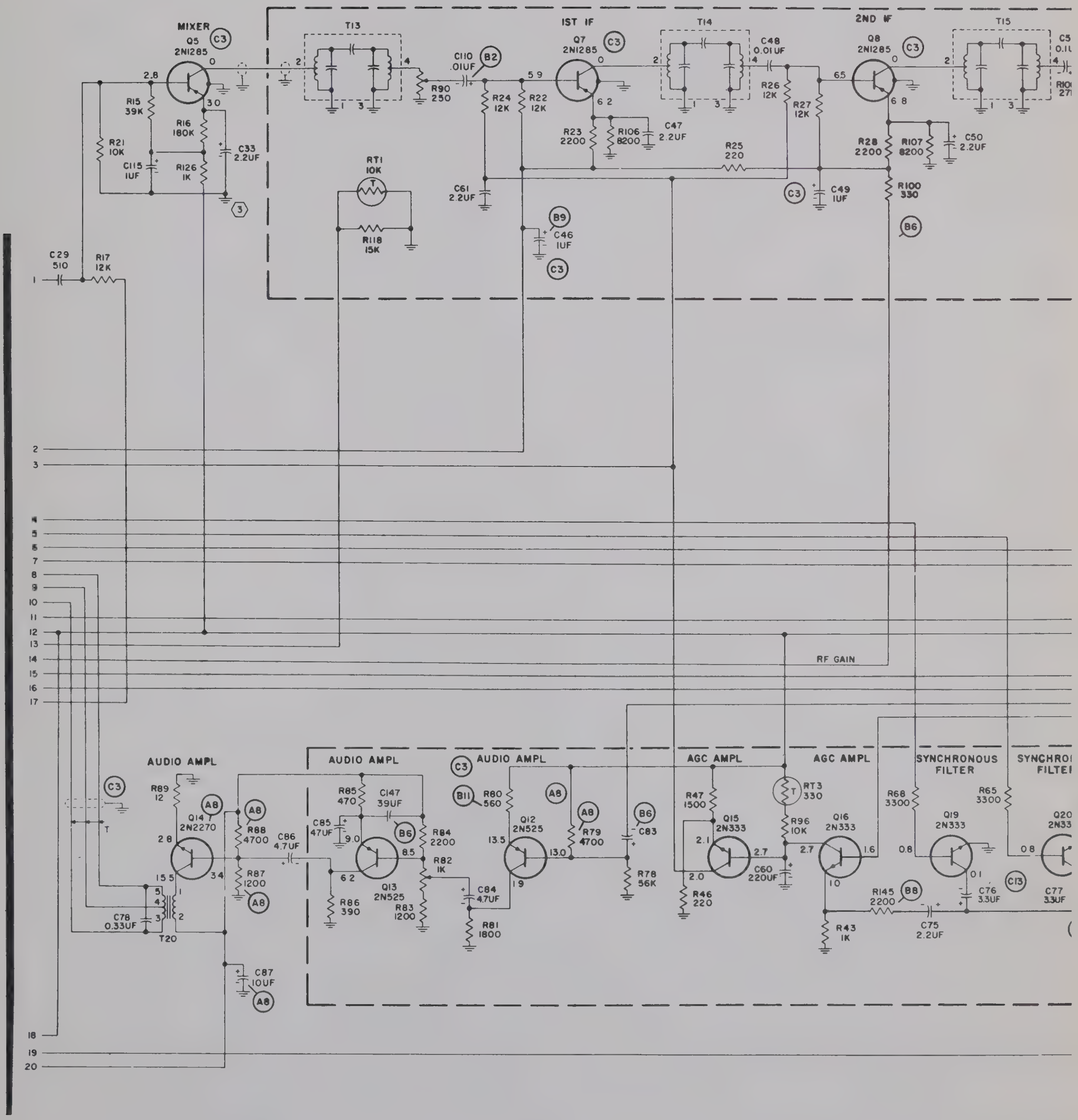
51Y-4A ADF Receiver, Through MCN 1083,
Schematic Diagram (Sheet 3 of 4)
Figure 814


BALANCED MODULATOR
L17
0.5MH
A3
R141
10K
C8
6
S1D
FRONT
3
R8
10K
C8
5
R64
10K
4
S1D
REAR
Q3
2N1285
C3
6.0
0.8
6.2
R5
390
R95
2700
C15
1UF
R91
1500
C14
1UF
R4
10K
R98
1K
R7
316
R6
220
C3
RT2
100
C11
0.01UF
C12
0.01UF
C13
0.02UF
CR15
1N270
CR16
1N270
R9
1800
R10
5K
C3
P
1
2
3
4
5
6
7
8
9
10
11
HINGE
TUNING SERVO AMPLIFIER
R111
25K
R54
470
C70
1UF
R113
2200
CR6
1N270
CR9
1N270
R1
R2
R55
12K
Q26
2N525
11.2
10.5
11.4
R56
1K
R57
150
C71
47UF
C112
150UF
R114
390
C72
1UF
R58
2200
R59
12K
Q27
2N525
11.3
0.8
11.4
R60
1K
R61
150
C73
47UF
C122
0.11UF
B1
T19
1
2
3
4
5
6
Q28
2N2405
A8
11.8
25.4
C9
C150
330
R62
15
12.4
C74
2.5UF
E1
12.0
R115
560
RED
BLK
0.1
Q29
2N2405
0.5
R63
15
A8
MG1
MOT
GEN
BLUE
BROWN
WHT
YEL
ORN
GRAY
12
13
14
15
C3
P
2
CTED
B1
S1
S2
S3
9
10
11
16
8
J3
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT

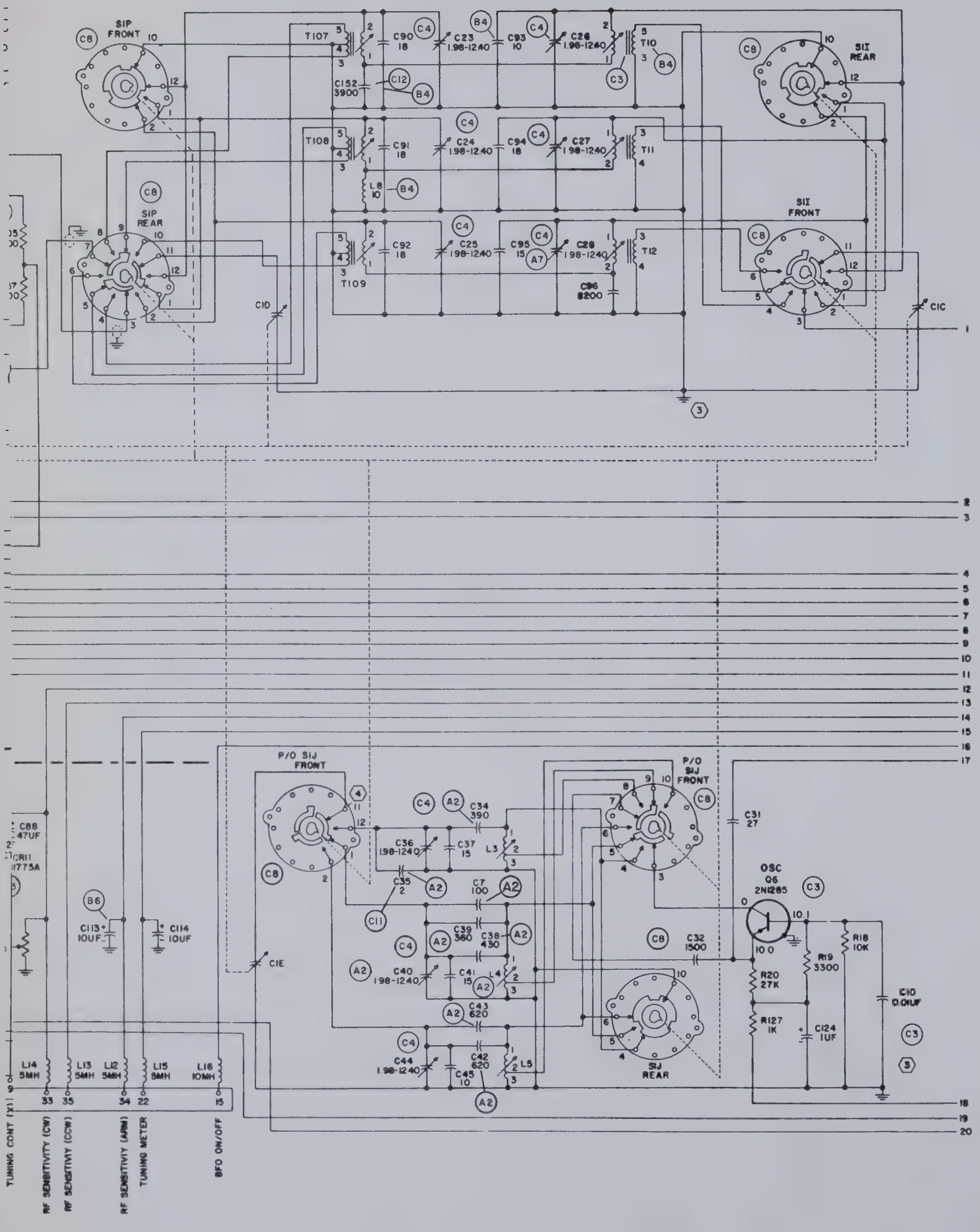

L27 160
L29 36
S1-O REAR
T104
L28 75
C16 1.98-1240
SIC FRONT
SIN FRONT
Q4 2N1285 RF AMPL
SIP FRONT
T107
C90 18
C23 1.98-1240
C93 10
C26 1.98-1240
T10
SII REAR
T105
L30 15
C17 1.98-1240
SIR FRONT
SIC REAR
C131 2000
C1A
C137
SIN REAR
R135 22K
R13 1500
C135 .01UF
R105 4700
R136 0-2000
L31 27
R137 4700
Q2 2N1285
SIP REAR
T108
C91 18
C24 1.98-1240
C94 18
C27 1.98-1240
T11
L8 10
T109
C92 18
C25 1.98-1240
C95 15
C28 1.98-1240
T12
C96 8200
C132 3900
C1D
SII FRONT
C1C
L26 10
SIR REAR
T106
C18 1.98-1240
C138 270
R14 12K
C118 1UF
R117 220
L25 4.7
RF GAIN
AGC
ANT
GRD AT ANT
HINGE
VOLTAGE REGULATOR
SIK REAR
SIL REAR
C111 0.33UF
B2
SIM FRONT
R92 8
C104 0.02UF
Q30 2N174
R93 220
Q31 2N2405
R128 22
C88 47UF
CR11 1N1775A
C103 0.1UF
R94 27K
C146 4UF
C116 47UF
CR4 .41N1722
SIK FRONT
SIL FRONT
SIM REAR
CR7 1N1116
L18 27
R131 1K
C113 10UF
C114 10UF
C1E
P/O SIJ FRONT
C34 390
C36 1.98-1240
C37 15
L3
C35 2
C7 100
C39 360
C38 430
C40 1.98-1240
C41 15
C43 620
C44 1.98-1240
C42 620
C45 10
L5
C31 27
C32 1500
OSC Q6 2N1285
R18 10K
R19 3300
R20 27K
R127 1K
C124 1UF
C10 0.01UF
SIJ REAR
L14 5MH
L13 5MH
L12 5MH
L15 5MH
L16 10MH
AUDIO OUTPUT (HI)
AUDIO OUTPUT (CT)
AUDIO OUTPUT (LO)
BAND 3 SELECTOR
BAND 2 SELECTOR
BAND 1 SELECTOR
ANT MODE SELECTOR
LOOP MODE SELECTOR
ADF MODE SELECTOR
27.5VDC INPUT
DC GROUND
RF SENSITIVITY (CW)
RF SENSITIVITY (CCW)
RF SENSITIVITY (ARM)
TUNING METER
BFO ON/OFF

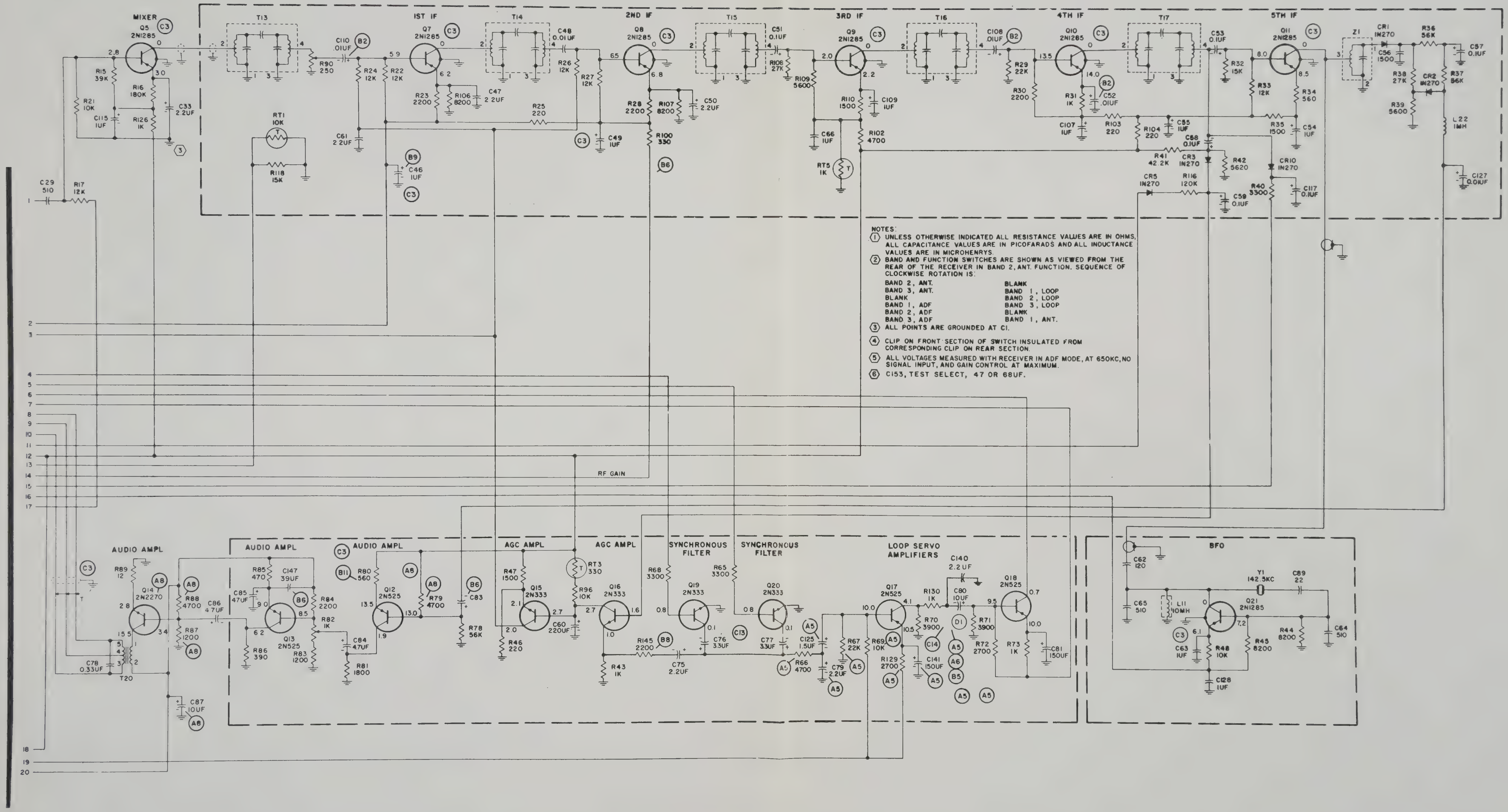
51Y-4A ADF Receiver, Through MCN 1083,
Schematic Diagram (Sheet 3 of 4)
Figure 814


S1P FRONT
C8
10
12
1
2
T107
5
4
3
2
1
C90 18
C4
C23 1.98-12.40
B4
C93 10
C4
C26 1.98-12.40
T10
3
B4
C3
C152 3900
C12
B4
S1X REAR
C8
9
10
12
1
2
T108
C91 18
C4
C24 1.98-12.40
C94 18
C4
C27 1.98-12.40
T11
L8 10
B4
C8
S1P REAR
9
10
8
7
11
6
12
5
1
4
3
2
T109
C92 18
C4
C25 1.98-12.40
C95 15
C4
A7
C28 1.98-12.40
T12
C96 8200
C1D
S1I FRONT
C8
11
6
12
5
1
4
3
2
C1C
1
3
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
P/O S1J FRONT
4
11
12
1
2
C8
C4
A2
C34 390
L3
C36 1.98-12.40
C37 15
C35 2
A2
C7 100
A2
C11
C39 360
C38 430
A2
C4
A2
C40 1.98-12.40
C41 15
L4
A2
A2
C43 620
C4
C44 1.98-12.40
C42 620
C45 10
L5
A2
P/O S1J FRONT
C8
9
10
8
7
6
5
4
3
C31 27
OSC Q6 2N1285
C3
C8
C32 1500
S1J REAR
10
6
5
4
R20 27K
R19 3300
R18 10K
R127 1K
C124 1UF
C10 0.01UF
C3
3
18
19
20
C88 47UF
CR11 1N775A
B6
C113 10UF
C114 10UF
L14 5MH
L13 5MH
L12 5MH
L15 5MH
L16 10MH
9
33
35
34
22
15
TUNING CONT (X1)
RF SENSITIVITY (CW)
RF SENSITIVIY (CCW)
RF SENSITIVIY (ARM)
TUNING METER
BFO ON/OFF


MIXER
Q5
2N1285
C3
T13
C110
.01UF
B2
R90
250
R24
12K
R22
12K
IST IF
Q7
2N1285
T14
C48
0.01UF
2ND IF
Q8
2N1285
T15
R15
39K
R16
180K
R21
10K
C115
1UF
R126
1K
C33
2.2UF
RT1
10K
R118
15K
C61
2.2UF
B9
C46
1UF
R23
2200
R106
8200
C47
2.2UF
R25
220
R26
12K
R27
12K
C49
1UF
R28
2200
R107
8200
C50
2.2UF
R100
330
B6
C29
510
R17
12K
RF GAIN
AUDIO AMPL
R89
12
Q14
2N2270
A8
R88
4700
R87
1200
C86
4.7UF
T20
C78
0.33UF
C87
10UF
R85
470
C147
39UF
C85
47UF
Q13
2N525
R84
2200
R82
1K
R83
1200
R86
390
C84
4.7UF
R81
1800
R80
560
B11
Q12
2N525
R79
4700
R78
56K
C83
AGC AMPL
R47
1500
Q15
2N333
R46
220
RT3
330
R96
10K
C60
220UF
Q16
2N333
R43
1K
R145
2200
B8
C75
2.2UF
SYNCHRONOUS
FILTER
R68
3300
Q19
2N333
C76
3.3UF
C13
R65
3300
C77
3.3UF
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

51Y-4A ADF Receiver, Through MCN 1083,
Schematic Diagram (Sheet 4 of 4)
Figure 814


SIP FRONT
SIP REAR
SII REAR
SII FRONT
T107
T108
T109
T10
T11
T12
C90 18
C23 1.98-12.40
C93 10
C26 1.98-12.40
C152 3900
C91 18
C24 1.98-12.40
C94 18
C27 1.98-12.40
L8 10
C92 18
C25 1.98-12.40
C95 15
C28 1.98-12.40
C96 8200
C1D
C1C
C1E
P/O SIJ FRONT
SIJ REAR
C34 390
C36 1.98-12.40
C37 15
L3
C35 2
C7 100
C39 360
C38 430
C40 1.98-12.40
C41 15
L4
C43 620
C44 1.98-12.40
C42 620
C45 10
L5
C31 27
OSC Q6 2N1285
C32 1500
R20 27K
R19 3300
R18 10K
R127 1K
C124 1UF
C10 0.01UF
C88 47UF
CR11 1775A
C113 10UF
C114 10UF
L14 5MH
L13 5MH
L12 5MH
L15 5MH
L16 10MH
C8
C4
B4
C3
C12
A7
A2
C11
B6
TUNING CONT (X1)
RF SENSITIVITY (CW)
RF SENSITIVITY (CCW)
RF SENSITIVITY (ARM)
TUNING METER
BFO ON/OFF
9
33
35
34
22
15
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20


MIXER
Q5
2N1285
T13
R90
250
C110
.01UF
1ST IF
Q7
2N1285
T14
C48
0.01UF
2ND IF
Q8
2N1285
T15
C51
0.1UF
3RD IF
Q9
2N1285
T16
C108
.01UF
4TH IF
Q10
2N1285
T17
C53
0.1UF
5TH IF
Q11
2N1285
Z1
CR1
1N270
R36
56K
C57
0.1UF
RT1
10K
R118
15K
RT5
1K
L22
1MH
C29
510
R17
12K
RF GAIN
AUDIO AMPL
Q14
2N2270
T20
C78
0.33UF
C87
10UF
AUDIO AMPL
Q13
2N525
AUDIO AMPL
Q12
2N525
AGC AMPL
Q15
2N333
RT3
330
AGC AMPL
Q16
2N333
SYNCHRONOUS FILTER
Q19
2N333
SYNCHRONOUS FILTER
Q20
2N333
LOOP SERVO AMPLIFIERS
Q17
2N525
C140
2.2UF
Q18
2N525
BFO
C62
120
C65
510
L11
10MH
Y1
142.5KC
C89
22
Q21
2N1285
R44
8200
C64
510
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

NOTES:

① UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

② BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:

BAND 2, ANT.
BAND 3, ANT.
BLANK
BAND 1, ADF
BAND 2, ADF
BAND 3, ADF
BLANK
BAND 1, LOOP
BAND 2, LOOP
BAND 3, LOOP
BLANK
BAND 1, ANT.

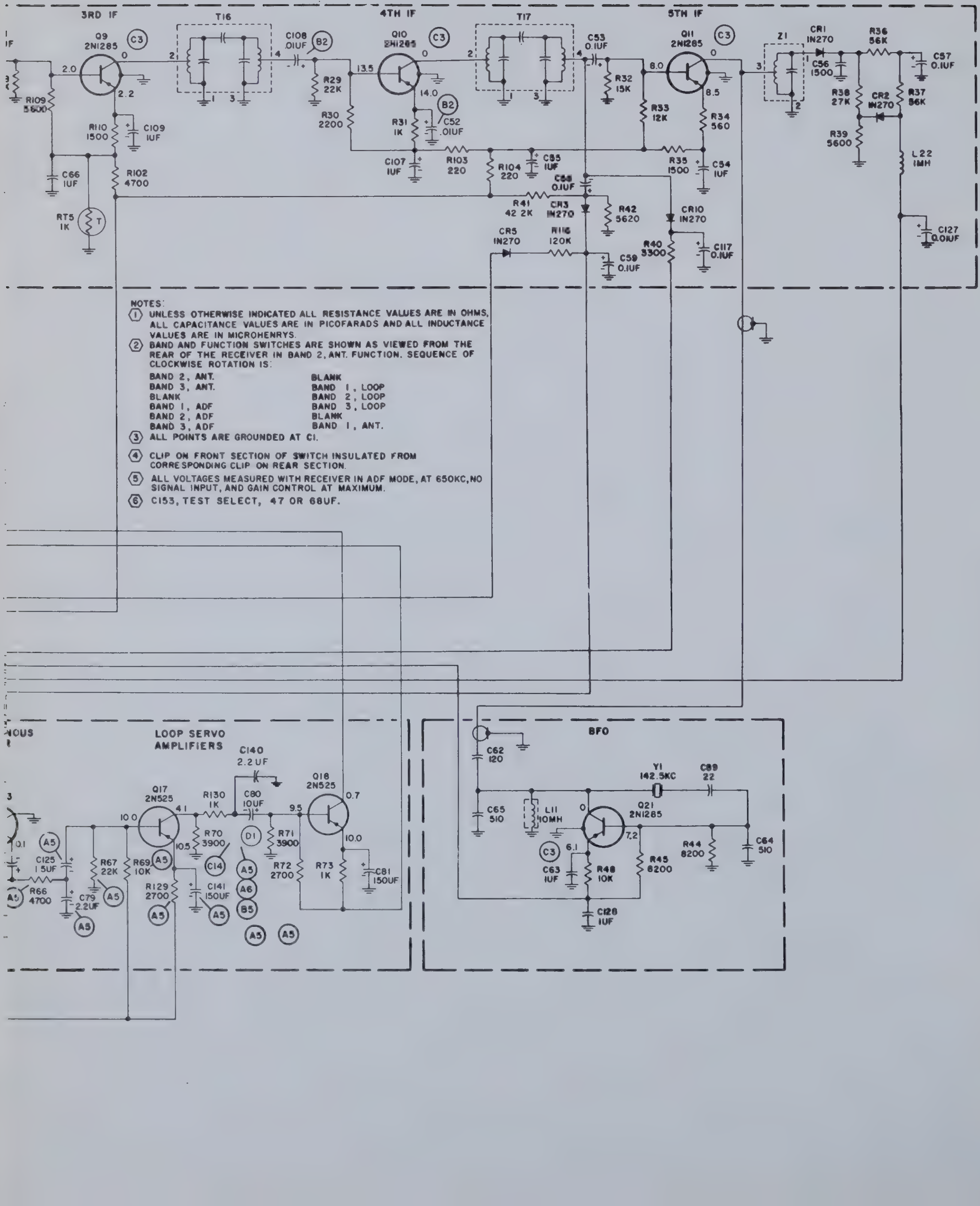
③ ALL POINTS ARE GROUNDED AT C1.

④ CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.

⑤ ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.

⑥ C153, TEST SELECT, 47 OR 68UF.

51Y-4A ADF Receiver, Through MCN 1083,
Schematic Diagram (Sheet 4 of 4)
Figure 814


IF
3RD IF
Q9
2N1285
C3
2.0
0
2.2
R109
5600
R110
1500
C109
1UF
C66
1UF
R102
4700
RT5
1K
T
T16
2
4
1
3
C108
.01UF
B2
R29
22K
R30
2200
4TH IF
Q10
2N1285
C3
13.5
0
14.0
B2
R31
1K
C52
.01UF
C107
1UF
R103
220
R104
220
C85
1UF
T17
2
4
1
3
C53
0.1UF
R32
15K
C58
0.1UF
R41
42 2K
CR3
1N270
R42
5620
CR5
1N270
R116
120K
C59
0.1UF
5TH IF
Q11
2N1285
C3
8.0
0
8.5
R33
12K
R34
560
R35
1500
C54
1UF
CR10
1N270
R40
3300
C117
0.1UF
Z1
3
1
2
CR1
1N270
C56
1500
R36
56K
C57
0.1UF
R38
27K
CR2
1N270
R37
56K
R39
5600
L22
1MH
C127
0.01UF
NOUS
3
LOOP SERVO
AMPLIFIERS
0.1
A5
C125
1.5UF
R66
4700
A5
C79
2.2UF
A5
R67
22K
A5
10.0
Q17
2N525
4.1
10.5
R69
10K
A5
R129
2700
A5
C141
150UF
A5
R130
1K
C140
2.2 UF
C80
10UF
R70
3900
C14
D1
A5
A6
B5
A5
A5
R71
3900
9.5
Q18
2N525
0.7
10.0
R72
2700
R73
1K
C81
150UF
BFO
C62
120
C65
510
L11
10MH
C3
Y1
142.5KC
C89
22
0
Q21
2N1285
7.2
6.1
C63
1UF
R48
10K
R45
8200
R44
8200
C64
510
C128
1UF

NOTES:

① UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

② BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:

BAND 2, ANT.
BAND 3, ANT.
BLANK
BAND 1, ADF
BAND 2, ADF
BAND 3, ADF
BLANK
BAND 1, LOOP
BAND 2, LOOP
BAND 3, LOOP
BLANK
BAND 1, ANT.

③ ALL POINTS ARE GROUNDED AT C1.

④ CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.

⑤ ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.

⑥ C153, TEST SELECT, 47 OR 68UF.

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	A1	Capacitor C151, 68 pf; is changed to a selected value.	To adjust frequency of 110-Hz oscillator		
4	A1	Note ⟨6⟩ is changed to include C151 and increased number of select values.	Explain selected values of C151 and C153.		
2	A2	Capacitor C166, 12 pf, is added.	Added capacity required for receiver tracking.		
2	A3	Circuit involving Q1, Q3, S1D, and S1E is changed.	Design change for improved operation.		
2	A4	Capacitor C150, 330 pf, is changed to 560 pf.	To eliminate high frequency oscillation in tuning of servo amplifier.		
3	A5	Capacitor C165, 12 pf, is added.	To correct high frequency intermodulation problems.		
3	A6	Capacitor C165, 12 pf, is deleted.	Part not needed after A9 revision.		

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1A of 4)
Figure 814A

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	A7	Resistor R152, 47 ohms, is changed to 68 ohms.	To correct high frequency intermodulation problems.		
3	A8	Resistor R152, 68 ohms, is deleted.	Part not needed after A9 revision.		
3	A9	Capacitor C133, 0.01 uf, is changed to 0.1 uf. Coil L31, 27 uh, is deleted. Coils L35 and L36, 27 uh, are added. Capacitor C163, 0.1 uf, is added.	To correct high frequency intermodulation problems.		
3	A10	Resistor R14, 12K, is changed to 10K.	To improve agc characteristics.		
3	A11	Resistor R165, 560 ohms, is added.	To change range of adjustment for gain of loop servo amplifier.		
3	A12	Capacitor C37, 10 pf, is added.	Correct drawing error.		
3	A13	Capacitor C41, 15 pf, is changed to 5 pf.	Correct drawing error.		
3	A14	Capacitor C45, 10 pf, is changed to 5 pf.	Improve tuning characteristics.		

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1B of 4)
Figure 814A

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	A15	Resistor R19, 3300 ohms, is changed to 2200 ohms.	Change operating bias of Q6 for reduced collector-base capacitance.		
4	A16	Capacitor C87, 10 uf, is changed to 68 uf.	Increased decoupling of audio from B+.		
4	A17	Polarity shown for capacitor C86 is changed.	Correct drawing error.		
4	A18	Polarity for capacitor C147 is added.	Correct drawing error.		
4	A19	Capacitor C84, 4.7 uf, is changed to .33 uf.	Improve reponse curve of audio stages.		
4	A20	Resistor R80, 1K, is changed to 820 ohms.	Adjust overall gain of audio stages.		
4	A21	Resistor R80, 820 ohms, is changed to 1.2K.	Same as above.		
4	A22	Resistor R166, 1K, is added.	Reduce gain to eliminate high frequency oscillation.	30	MCN 4237 and above.
4	A23	Resistor R130, 2700 ohms, is changed to 4700 ohms.	Reduce gain of loop servo amplifier.		

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1C of 4)
Figure 814A

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	A24	Resistor R71, 3900 ohms, is changed to 8200 ohms.	Increase dynamic range of signal handling capability of stage.		
4	A25	Resistor R72, 2700 ohms, is changed to 4700 ohms.	Same as above.		
4	A26	Resistor R73, 1 kilohm is changed to 680 ohms.	Same as above.		
4	A27	Resistor R167, 1K, is added.	Reduce gain to eliminate high frequency oscillation.	30	MCN 4237 and above.
4	A28	Resistor R40, 3300 ohms is changed to 2700 ohms.	Change signal level to tuning meter because of new meter type.		
4	A29	Ground connections of C63, C64, C65, C128, L11, and R44 are changed to shield of output coax cable.	Reduce amount of bfo radiation.		
2	A30	Capacitor C126, 5 pf, is changed to 7 pf.	To provide better temperature control characteristics.		

51Y-4A ADF Receiver MCN 1084 and Above, Schematic Diagram (Sheet 1D of 4)
Figure 814A

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	A31	Capacitor C126, 7 pf, is changed to 5 pf.	Combination of A2 revision and design change in transformer T3 resulting in lower capacity requirement.		
2	A32	Capacitor C13, 0.02 uf, is changed to 0.01 uf.	Reduced fabrication cost.		
3	A33	Capacitor C102, 5 pf, is added.	Improve tuning characteristics.		
3	A34	Transistor Q31 emitter symbol is changed.	Correct drawing error.		
3	A35	Capacitor C88, 47 μF, is changed to 68 μF.	Improve voltage supply filtering.		
3	A36	Coil L16, 10 mh, is replaced by resistor R157, 68 ohms.	Eliminate bfo radiation.		
3	A37	Capacitor C164, 10 uf, is added.	Reduce bfo radiation.		
3	A38	Capacitor C164, 10 uf is deleted.	Part not needed after A36 revision.		

51Y-4A ADF Receiver MCN 1084 and Above, Schematic Diagram (Sheet 1E of 4)
Figure 814A

51Y-4A ONLY

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
4	A39	Capacitor C47, 001 uf is changed to 0.1 uf.	Increase gain of if. amplifier.		
	A40	Capacitor C47, 0.1 uf is changed to 0.01 uf.	Adjust gain of if. amplifier		
4	A41	Capacitor C50, 0.01 uf is changed to 0.1 uf.	Adjust gain of if. amplifier.		
4	A42	Coil L34, 10 mh, is added.	Decrease bandwidth of if. amplifier.		
4	A43	Coil L34, 10 mh, is deleted.	Component not needed after design change of if. transformers.		
4	A44	Capacitor C108, 0.01 uf, is changed to 1200 pf.	Same as A42.		
4	A45	Capacitor C108, 1200 pf. is changed to 0.01 uf.	Increase bandwidth after A43 revision.		

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1F of 4)
Figure 814A

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	B1	Changed C74 from 2.5 to 1.5 μF.	Design change for improved operation.		MCN 9428 and above.
3	B2	Changed C131 from 2000 to 3000 pF.	Design change for improved operation.		MCN 143 and above.
3	B3	Changed R92 from 8 to 8.2 ohms.	Correct drawing error.		All.
3	B4	Changed R94 from 27 kilohms to 2700 ohms.	Correct drawing error.		All.
3	B5	Changed type number of CR4 from .41N17Z2 to .4M17Z5.	Correct drawing error.		All.
3	B6	Changed C88 from 68 to 150 μF.	Design change for improved operation.		MCN 4505 and above.
3	B7	Deleted R165, 560 ohms.	Design change for improved operation.		MCN 9428 and above.
3	B8	Changed C37 from 10 to 7 pF.	Design change for improved operation.		MCN 8069 and above.
3	B9	Changed C37, 15 pF to C35, 15 pF.	Correct schematic error.		All.

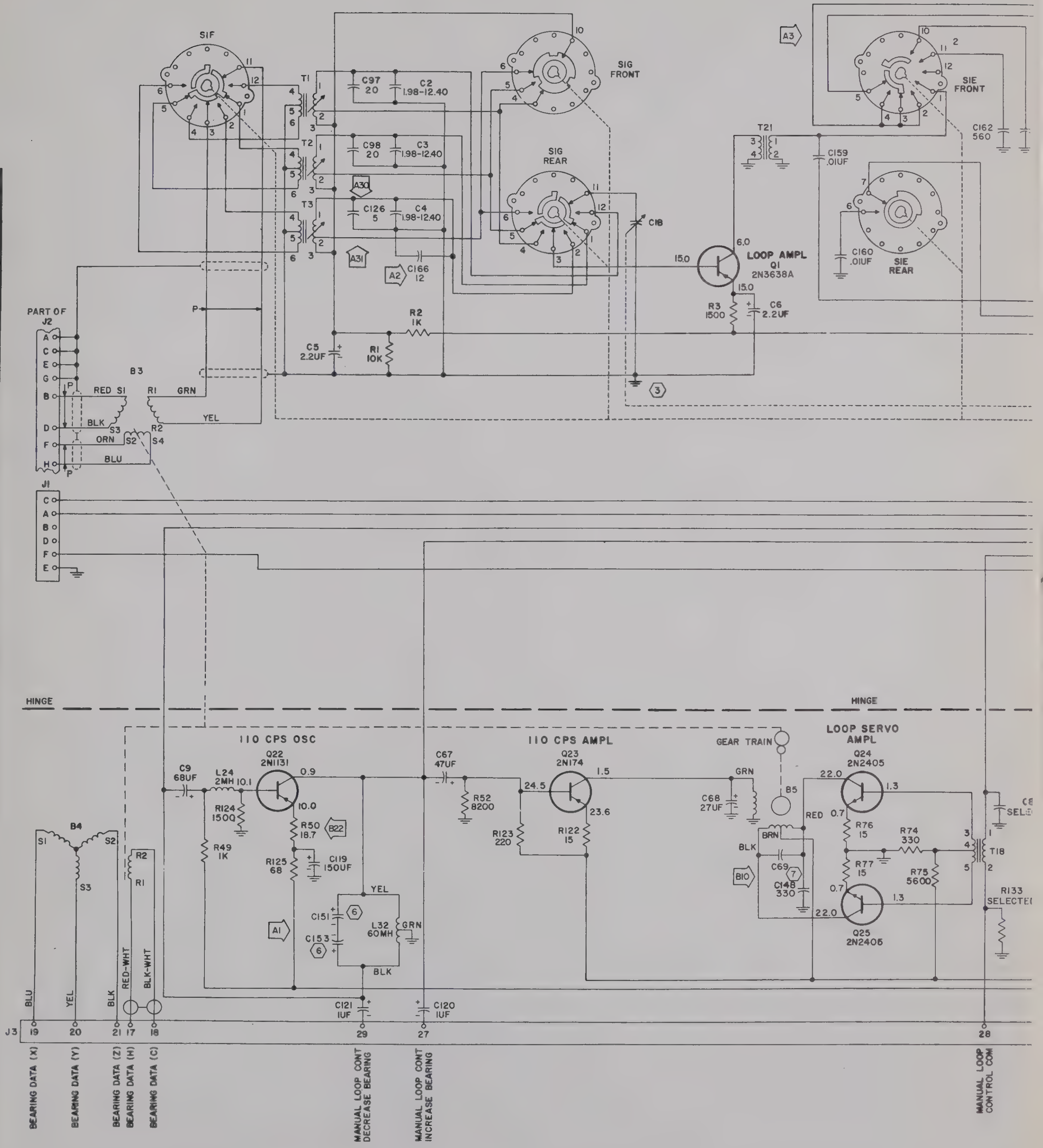
51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1G of 4)
Figure 814A

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
2	B10	Deleted value from C69 and added note 7.	Design change for improved operation.	33	MCN 7354 and above.
4	B11	Added R169 120 kilohms.	Eliminate "thump" in audio output when 614L-8 mode switch is changed from ADF to ANT position.	35	MCN 9075 and above.
2	B12	Changed transistors Q28 and Q29 from type pnp to type npn.	Correct schematic error.		All.
3	B12	Added R170, 4700 ohms.	Design change for improved operation.		MCN 11900 and above.
3	B13	Added R171, 560 ohms.	Design change for improved operation.		MCN 11900 and above.
3	B14	Added R183, 390 ohms. Deleted L35, 27 μ H.	Design change for improved operation.		MCN 12616 through 12917.
		Changed R183 from 390 ohms to 383 ohms.			MCN 12918 and above.
3	B15	Added R182, 390 ohms. Deleted L36, 27 μ H.	Design change for improved operation.		MCN 12616 through 12917.

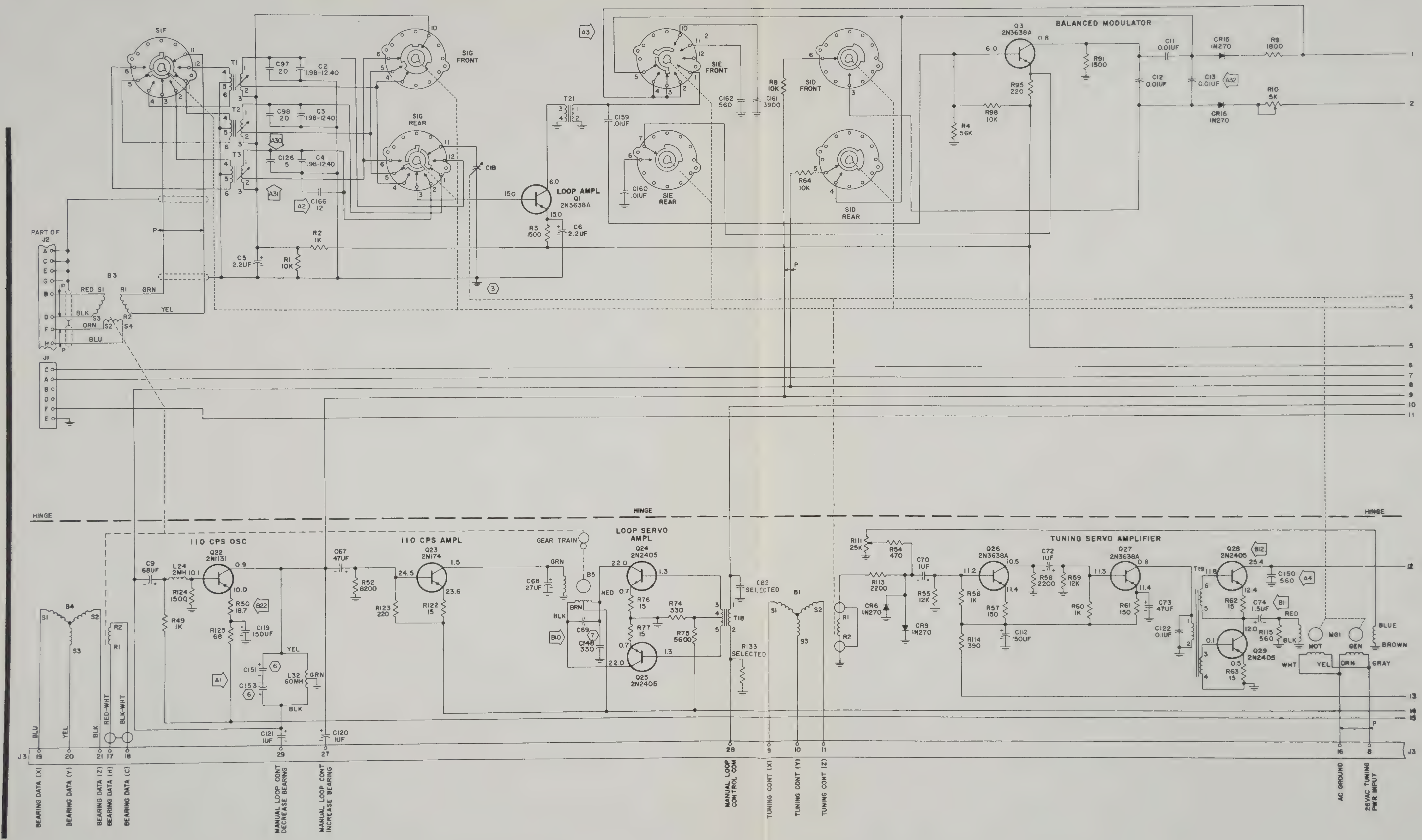
51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1H of 4)
Figure 814A

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
		Changed R182 from 390 to 383 ohms.			MCN 12918 and above.
3	B16	Added C182, 15 pF.	Design change for improved operation.		MCN 12616 and above.
3	B17	Added C183, 15 pF.	Design change for improved operation.		MCN 12616 and above.
3	B18	Changed C111, from 0.33 to 0.28 μF.	Improve audio frequency response.		
4	B19	Changed C78 from 0.33 to 0.28 μF.	Improve audio frequency response.		
4	B20	Changed R24 from 12 to 15 kilohms.	Improve receiver gain.		MCN 1084 and above.
4	B21	Changed R80 from 1200 to 1000 ohms.	Increase gain of audio amplifier.		MCN 8821 and above.
2	B22	Changed R50 from 22 to 18.7 ohms.	Design change for improved operation.		MCN 11508 and above.

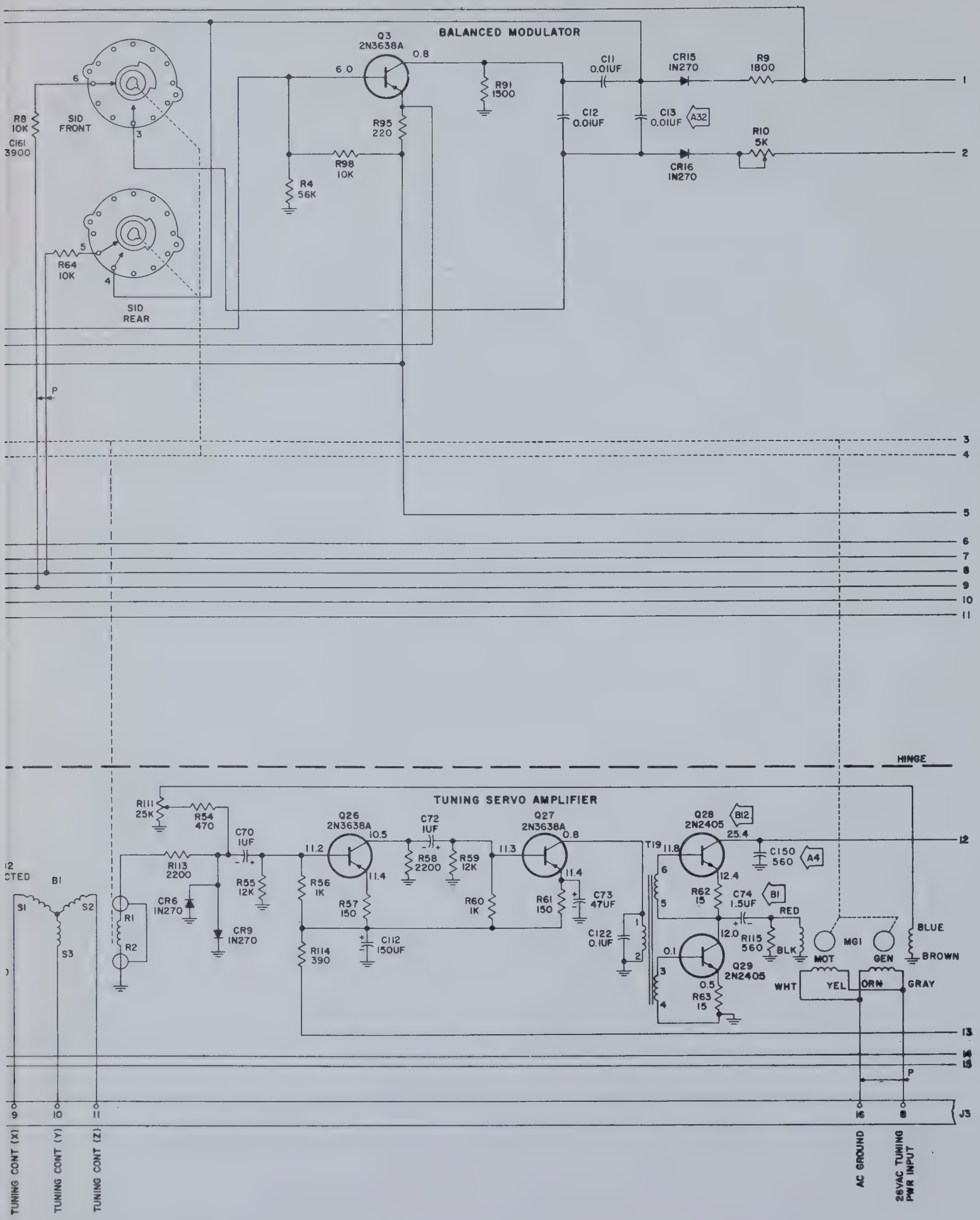
51Y-4/4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 1I of 4)
Figure 814A

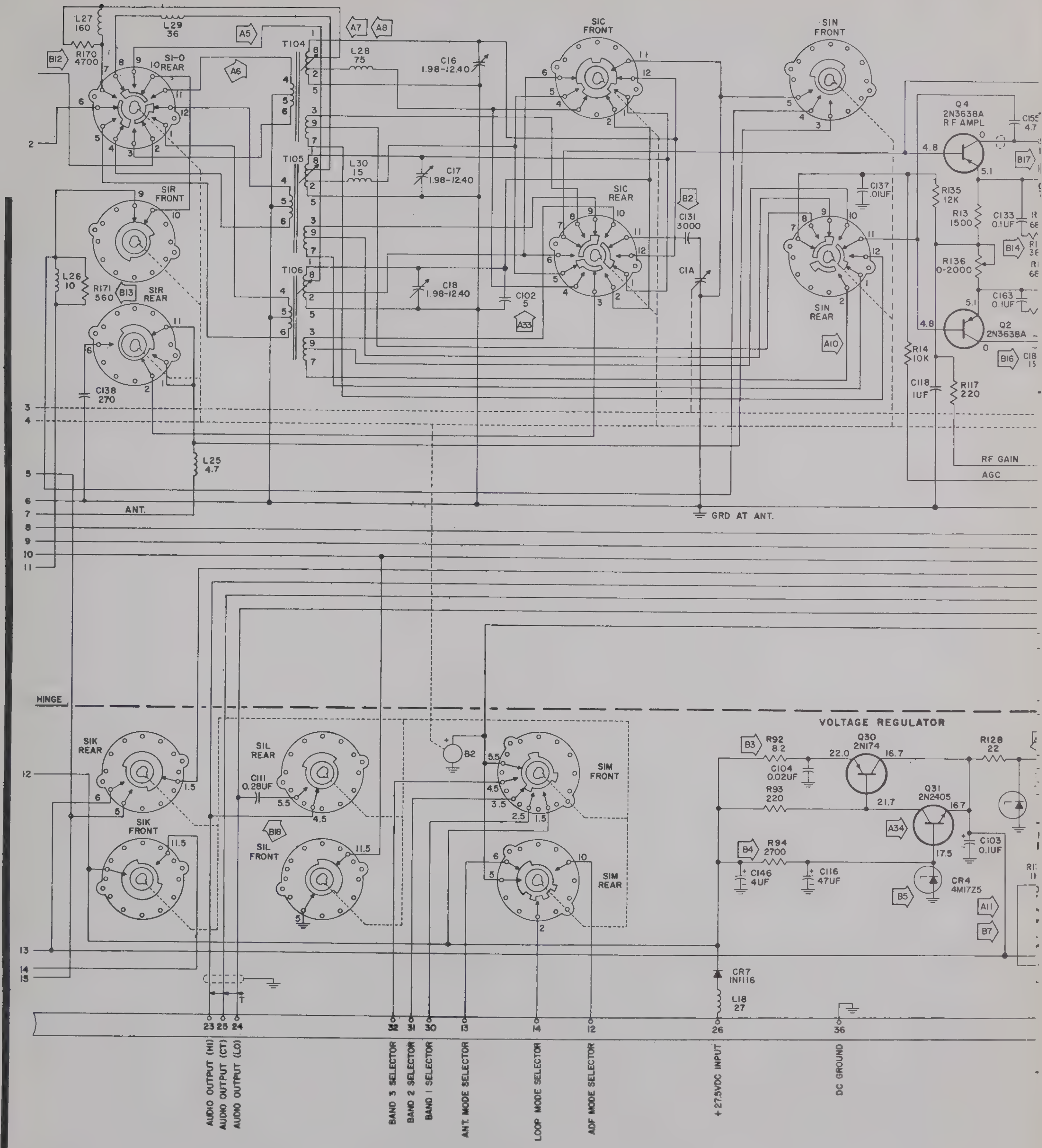

S1F
T1
T2
T3
C97
20
C2
1.98-12.40
C98
20
C3
1.98-12.40
C126
5
C4
1.98-12.40
A30
A31
A2
C166
12
SIG
FRONT
SIG
REAR
C18
A3
SIE
FRONT
SIE
REAR
T21
C159
.01UF
C160
.01UF
C162
560
LOOP AMPL
Q1
2N3638A
15.0
6.0
R3
1500
C6
2.2UF
R2
1K
R1
10K
C5
2.2UF
3
PART OF
J2
B3
RED
S1
R1
GRN
BLK
S3
R2
YEL
ORN
S2
S4
BLU
P
J1
HINGE
110 CPS OSC
Q22
2N1131
C9
68UF
L24
2MH
10.1
0.9
10.0
R124
150Ω
R50
18.7
B22
R49
1K
R125
68
C119
150UF
YEL
C151
6
L32
60MH
GRN
A1
C153
6
BLK
C121
1UF
C67
47UF
C120
1UF
R52
8200
110 CPS AMPL
Q23
2N174
24.5
1.5
23.6
R123
220
R122
15
GEAR TRAIN
GRN
C68
27UF
B5
BRN
BLK
RED
C69
7
C148
330
B10
LOOP SERVO
AMPL
Q24
2N2405
22.0
0.7
1.3
R76
15
R74
330
R77
15
R75
5600
T18
Q25
2N2405
R133
SELECTED
B4
S1
S2
S3
R2
R1
BLU
YEL
BLK
RED-WHT
BLK-WHT
J3
19
20
21
17
18
29
27
28
BEARING DATA (X)
BEARING DATA (Y)
BEARING DATA (Z)
BEARING DATA (H)
BEARING DATA (C)
MANUAL LOOP CONT
DECREASE BEARING
MANUAL LOOP CONT
INCREASE BEARING
MANUAL LOOP
CONTROL COM

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 2 of 4)
Figure 814A

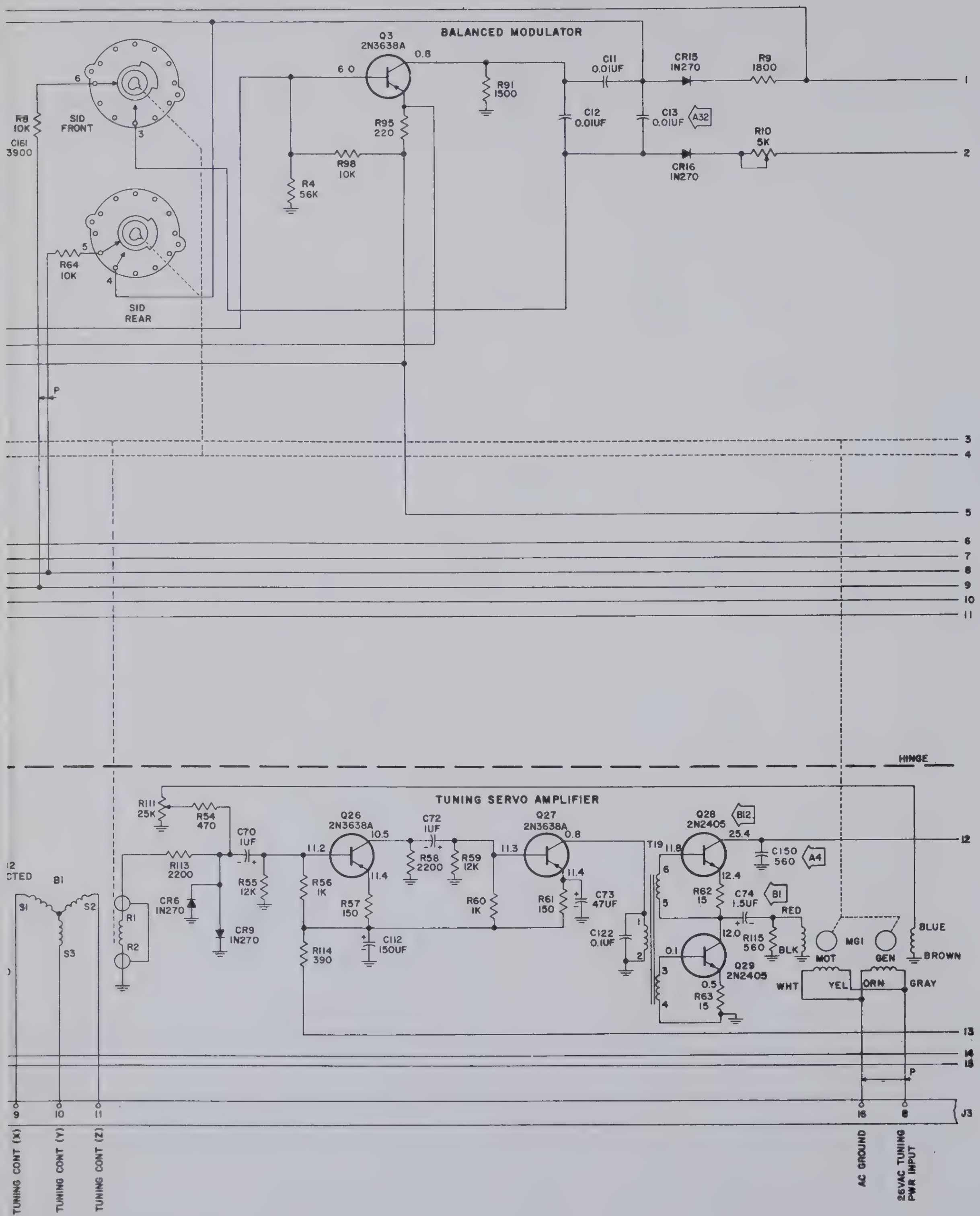

S1F
T1
T2
T3
C97 20
C2 1.98-12.40
C98 20
C3 1.98-12.40
C126 5
C4 1.98-12.40
A30
A31
A2
C166 12
SIG FRONT
SIG REAR
C18
A3
T21
C159 .01UF
SIE FRONT
SIE REAR
C160 .01UF
C162 560
C161 3900
R8 10K
SID FRONT
SID REAR
R64 10K
LOOP AMPL Q1 2N3638A
R3 1500
C6 2.2UF
R2 1K
R1 10K
C5 2.2UF
BALANCED MODULATOR
Q3 2N3638A
R91 1500
R95 220
R98 10K
R4 56K
C11 0.01UF
C12 0.01UF
C13 0.01UF
A32
CR15 1N270
CR16 1N270
R9 1800
R10 5K
PART OF J2
B3
RED S1
GRN
YEL
BLK
ORN
BLU
S3
S2
S4
R1
R2
J1
HINGE
110 CPS OSC
Q22 2N1131
C9 68UF
L24 2MH
R124 1500
R49 1K
R50 18.7
B22
R125 68
C119 150UF
A1
C151
C153
L32 60MH
C121 1UF
110 CPS AMPL
Q23 2N174
C67 47UF
R52 8200
R123 220
R122 15
C120 1UF
GEAR TRAIN
B5
C68 27UF
LOOP SERVO AMPL
Q24 2N2405
Q25 2N2405
R76 15
R77 15
R74 330
R75 5600
C69
C148 330
B10
T18
C82 SELECTED
R133 SELECTED
B1
B4
TUNING SERVO AMPLIFIER
R111 25K
R54 470
R113 2200
C70 1UF
CR6 1N270
CR9 1N270
R55 12K
Q26 2N3638A
R56 1K
R57 150
R114 390
C112 150UF
C72 1UF
R58 2200
R59 12K
R60 1K
Q27 2N3638A
R61 150
C73 47UF
C122 0.1UF
T19
Q28 2N2405
Q29 2N2405
C150 560
A4
B12
R62 15
C74 1.5UF
B1
R115 560
R63 15
MG1
MOT
GEN
BLUE
BROWN
GRAY
WHT
J3
BEARING DATA (X)
BEARING DATA (Y)
BEARING DATA (Z)
BEARING DATA (H)
BEARING DATA (C)
MANUAL LOOP CONT DECREASE BEARING
MANUAL LOOP CONT INCREASE BEARING
MANUAL LOOP CONTROL COM
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT

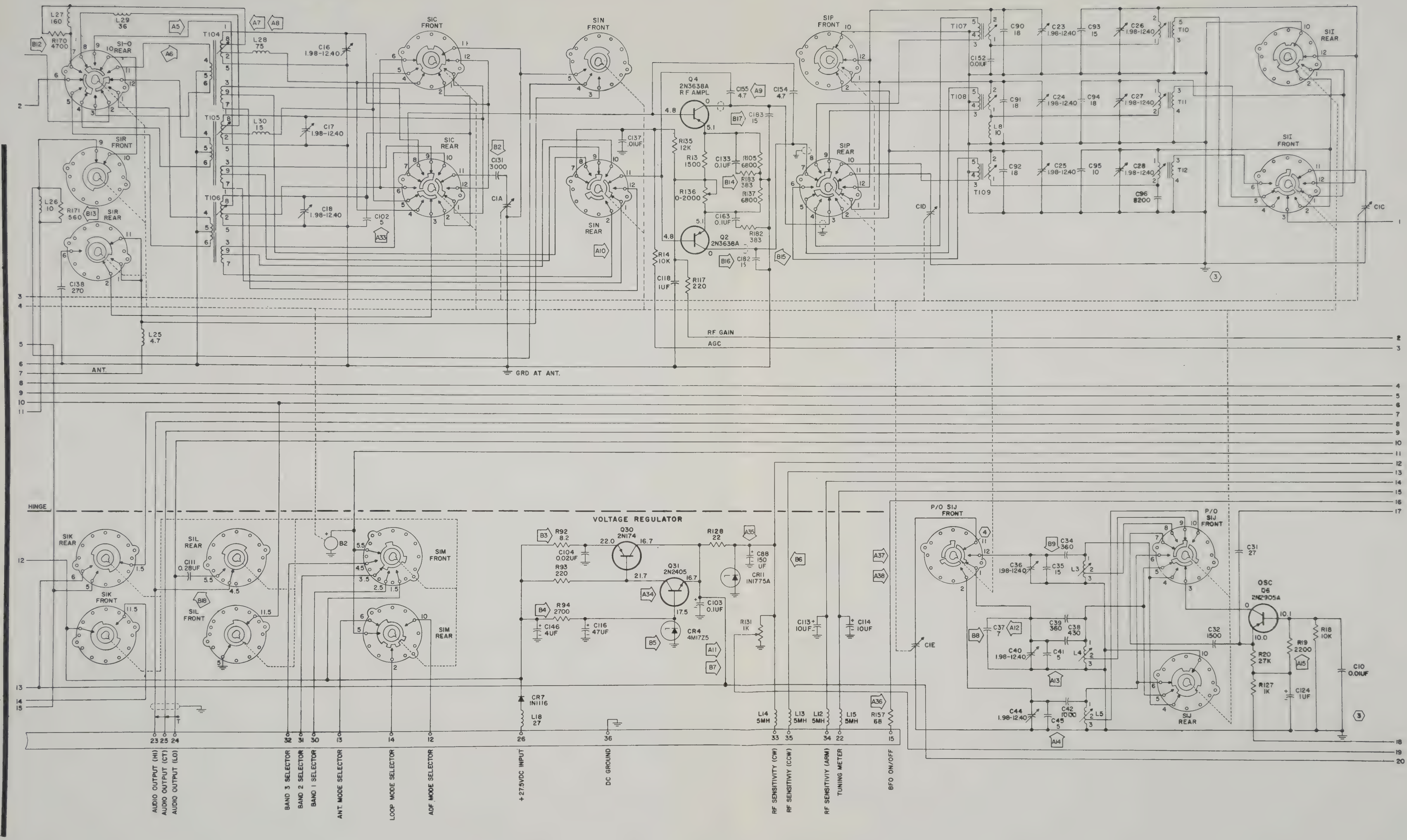
51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 2 of 4)
Figure 814A


BALANCED MODULATOR
Q3
2N3638A
6.0
0.8
R91
1500
R95
220
R98
10K
R4
56K
C11
0.01UF
C12
0.01UF
C13
0.01UF
A32
CR15
1N270
CR16
1N270
R9
1800
R10
5K
1
2
R8
10K
C161
3900
SID
FRONT
6
3
SID
REAR
5
4
R64
10K
P
3
4
5
6
7
8
9
10
11
HINGE
TUNING SERVO AMPLIFIER
R111
25K
R54
470
R113
2200
C70
1UF
R55
12K
CR6
1N270
CR9
1N270
R1
R2
B1
S1
S2
S3
12
CTED
Q26
2N3638A
11.2
10.5
11.4
R56
1K
R57
150
R114
390
C112
150UF
C72
1UF
R58
2200
R59
12K
R60
1K
Q27
2N3638A
11.3
0.8
11.4
R61
150
C73
47UF
C122
0.1UF
T19
1
2
3
4
5
6
Q28
2N2405
B12
11.8
25.4
12.4
C150
560
A4
R62
15
C74
1.5UF
B1
12.0
R115
560
RED
BLK
Q29
2N2405
0.1
0.5
R63
15
MG1
MOT
GEN
WHT
YEL
ORN
GRAY
BLUE
BROWN
12
13
14
15
P
9
10
11
16
8
J3
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING
PWR INPUT

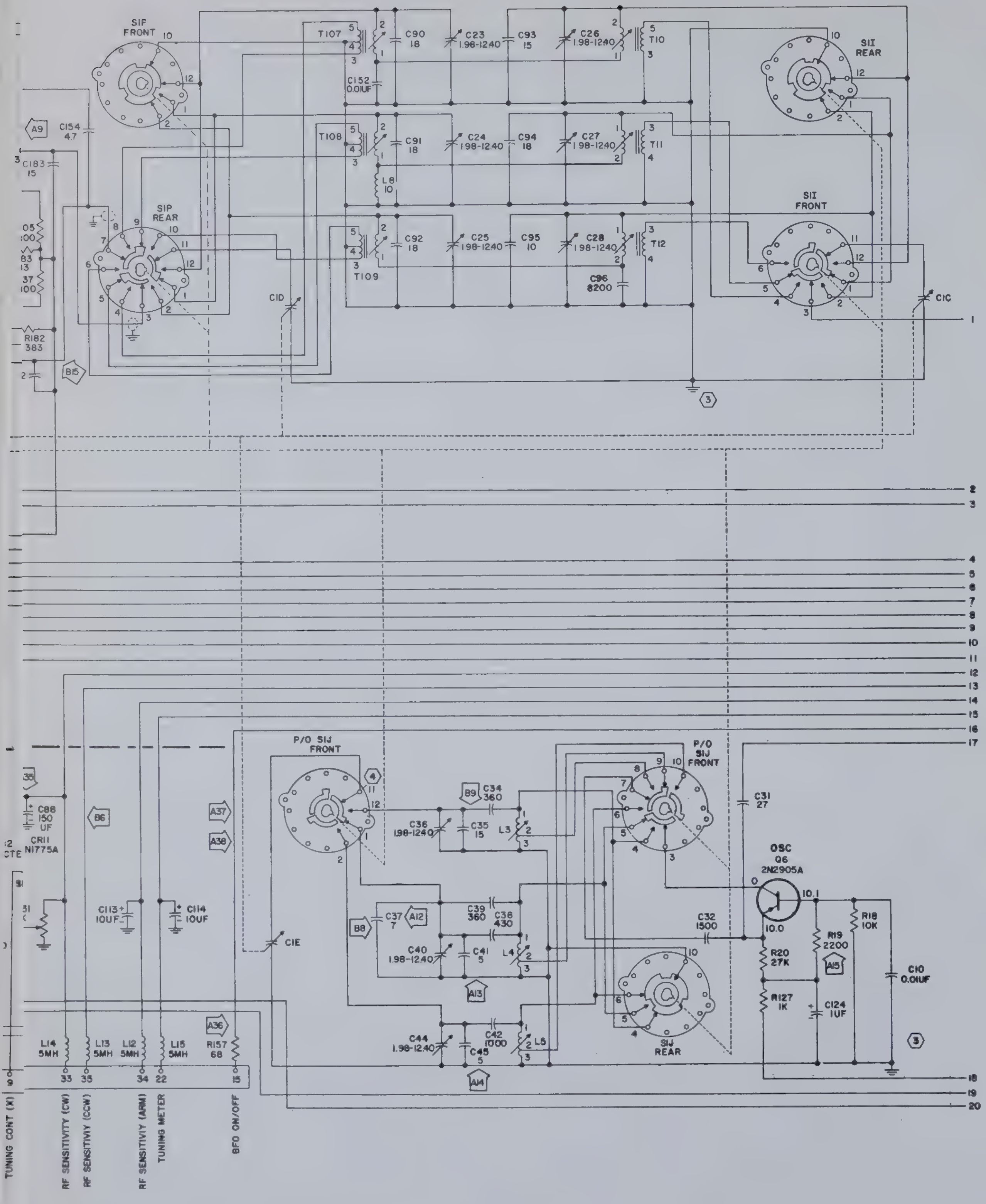

L27
160
L29
36
R170
4700
B12
A5
A6
A7
A8
S1-O
REAR
T104
T105
T106
L28
75
C16
1.98-12.40
L30
15
C17
1.98-12.40
C18
1.98-12.40
SIC
FRONT
SIC
REAR
SIN
FRONT
SIN
REAR
SIR
FRONT
SIR
REAR
L26
10
R171
560
B13
C138
270
L25
4.7
ANT.
C102
5
A33
B2
C131
3000
C1A
C137
.01UF
GRD AT ANT.
A10
Q4
2N3638A
RF AMPL
C155
4.7
B17
4.8
5.1
R135
12K
R13
1500
C133
0.1UF
B14
R136
0-2000
C163
0.1UF
Q2
2N3638A
B16
R14
10K
C118
1UF
R117
220
RF GAIN
AGC
HINGE
SIK
REAR
SIK
FRONT
SIL
REAR
SIL
FRONT
C111
0.28UF
B18
B2
SIM
FRONT
SIM
REAR
VOLTAGE REGULATOR
B3
R92
8.2
C104
0.02UF
R93
220
Q30
2N174
22.0
16.7
21.7
Q31
2N2405
16.7
A34
R128
22
C103
0.1UF
17.5
B4
R94
2700
C146
4UF
C116
47UF
CR4
4M17Z5
B5
A11
B7
CR7
1N1116
L18
27
23
25
24
32
31
30
13
14
12
26
36
AUDIO OUTPUT (HI)
AUDIO OUTPUT (CT)
AUDIO OUTPUT (LO)
BAND 3 SELECTOR
BAND 2 SELECTOR
BAND 1 SELECTOR
ANT. MODE SELECTOR
LOOP MODE SELECTOR
ADF MODE SELECTOR
+27.5VDC INPUT
DC GROUND

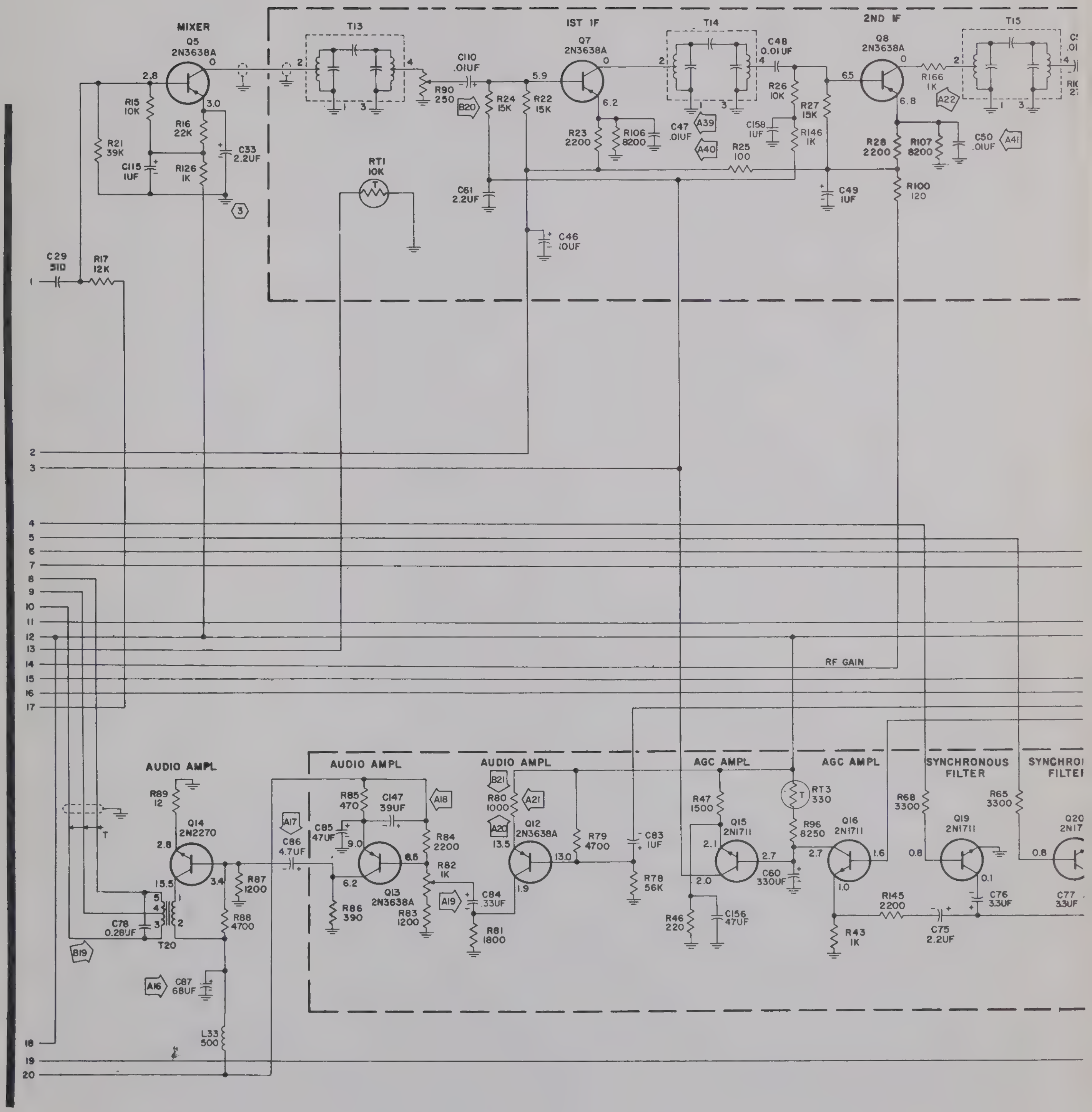
51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 3 of 4)
Figure 814A


BALANCED MODULATOR
Q3
2N3638A
6 0
0.8
R91
1500
R95
220
R98
10K
R4
56K
C11
0.01UF
C12
0.01UF
C13
0.01UF
A32
CR15
1N270
CR16
1N270
R9
1800
R10
5K
R8
10K
C161
3900
SID
FRONT
SID
REAR
R64
10K
6
3
5
4
P
1
2
3
4
5
6
7
8
9
10
11
HINGE
TUNING SERVO AMPLIFIER
R111
25K
R54
470
R113
2200
C70
1UF
R55
12K
CR6
1N270
CR9
1N270
R1
R2
12
CTED
B1
S1
S2
S3
Q26
2N3638A
11.2
10.5
11.4
R56
1K
R57
150
R114
390
C112
150UF
C72
1UF
R58
2200
R59
12K
R60
1K
Q27
2N3638A
11.3
0.8
11.4
R61
150
C73
47UF
C122
0.1UF
T19
6
5
1
2
3
4
Q28
2N2405
B12
11.8
25.4
12.4
C150
560
A4
R62
15
C74
1.5UF
B1
12.0
RED
R115
560
BLK
0.1
Q29
2N2405
0.5
R63
15
MG1
MOT
GEN
BLUE
BROWN
WHT
YEL
ORN
GRAY
12
13
14
15
P
9
10
11
16
8
J3
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT

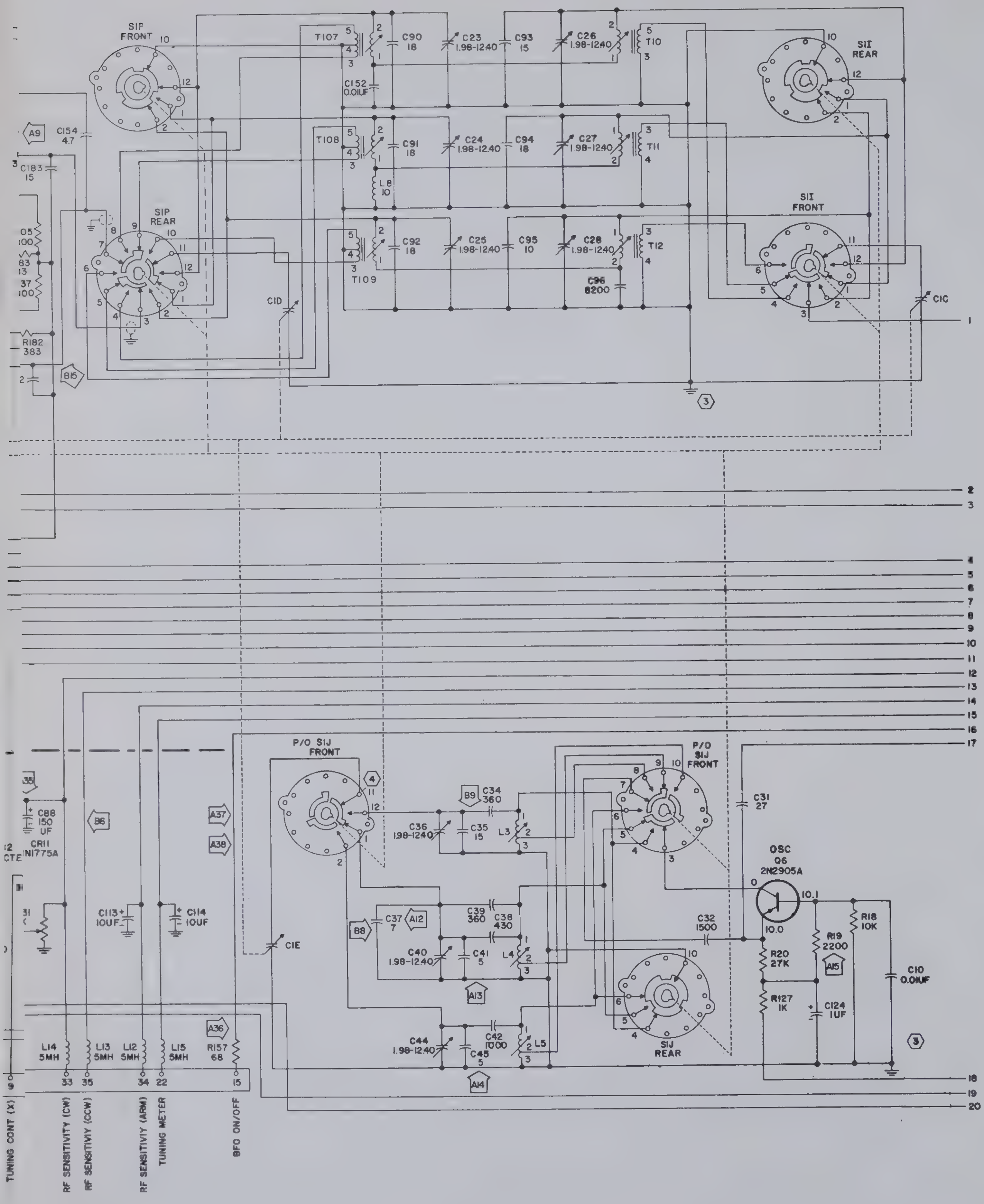

L27 160
L29 36
B12
R170 4700
S1-O REAR
A5
A7
A8
T104
L28 75
C16 1.98-12.40
SIC FRONT
SIN FRONT
A6
T105
L30 15
C17 1.98-12.40
SIR FRONT
T106
C18 1.98-12.40
L26 10
R171 560
B13
SIR REAR
C138 270
L25 4.7
SIC REAR
C102 5
A33
B2
C131 3000
C1A
SIN REAR
A10
Q4 2N3638A RF AMPL
C155 4.7
A9
C154 4.7
C183 15
B17
C137 .01UF
R135 12K
R13 1500
C133 0.1UF
R105 6800
B14
R183 383
R136 0-2000
R137 6800
C163 0.1UF
Q2 2N3638A
R182 383
C182 15
B16
B15
R14 10K
C118 1UF
R117 220
RF GAIN
AGC
ANT.
GRD AT ANT.
SIP FRONT
SIP REAR
C1D
T107
C90 18
C23 1.98-1240
C93 15
C26 1.98-1240
T10
C152 0.01UF
T108
C91 18
C24 1.98-1240
C94 18
C27 1.98-1240
T11
L8 10
C92 18
C25 1.98-1240
C95 10
C28 1.98-1240
T12
T109
C96 8200
SII REAR
SII FRONT
C1C
③
HINGE
SIK REAR
SIK FRONT
SIL REAR
C111 0.28UF
B18
SIL FRONT
B2
SIM FRONT
SIM REAR
VOLTAGE REGULATOR
B3
R92 8.2
C104 0.02UF
Q30 2N174
R93 220
Q31 2N2405
A34
B4
R94 2700
C146 4UF
C116 47UF
CR4 4M17Z5
B5
R128 22
A35
C88 150 UF
CR11 1N1775A
C103 0.1UF
A11
B7
B6
A37
A38
R131 1K
C113 10UF
C114 10UF
CR7 1N1116
L18 27
L14 5MH
L13 5MH
L12 5MH
L15 5MH
A36
R157 68
C1E
P/O SIJ FRONT
B9
C34 360
C36 1.98-1240
C35 15
L3
P/O SIJ FRONT
C31 27
OSC Q6 2N2905A
B8
C37 7
A12
C39 360
C38 430
C40 1.98-1240
C41 5
L4
A13
C32 1500
R20 27K
R19 2200
A15
R18 10K
R127 1K
C124 1UF
C10 0.01UF
C44 1.98-1240
C42 1000
C45 5
L5
A14
SIJ REAR
23 25 24 32 31 30 13 14 12 26 36 33 35 34 22 15
AUDIO OUTPUT (HI)
AUDIO OUTPUT (CT)
AUDIO OUTPUT (LO)
BAND 3 SELECTOR
BAND 2 SELECTOR
BAND 1 SELECTOR
ANT. MODE SELECTOR
LOOP MODE SELECTOR
ADF MODE SELECTOR
+27.5VDC INPUT
DC GROUND
RF SENSITIVITY (CW)
RF SENSITIVITY (CCW)
RF SENSITIVITY (ARM)
TUNING METER
BFO ON/OFF

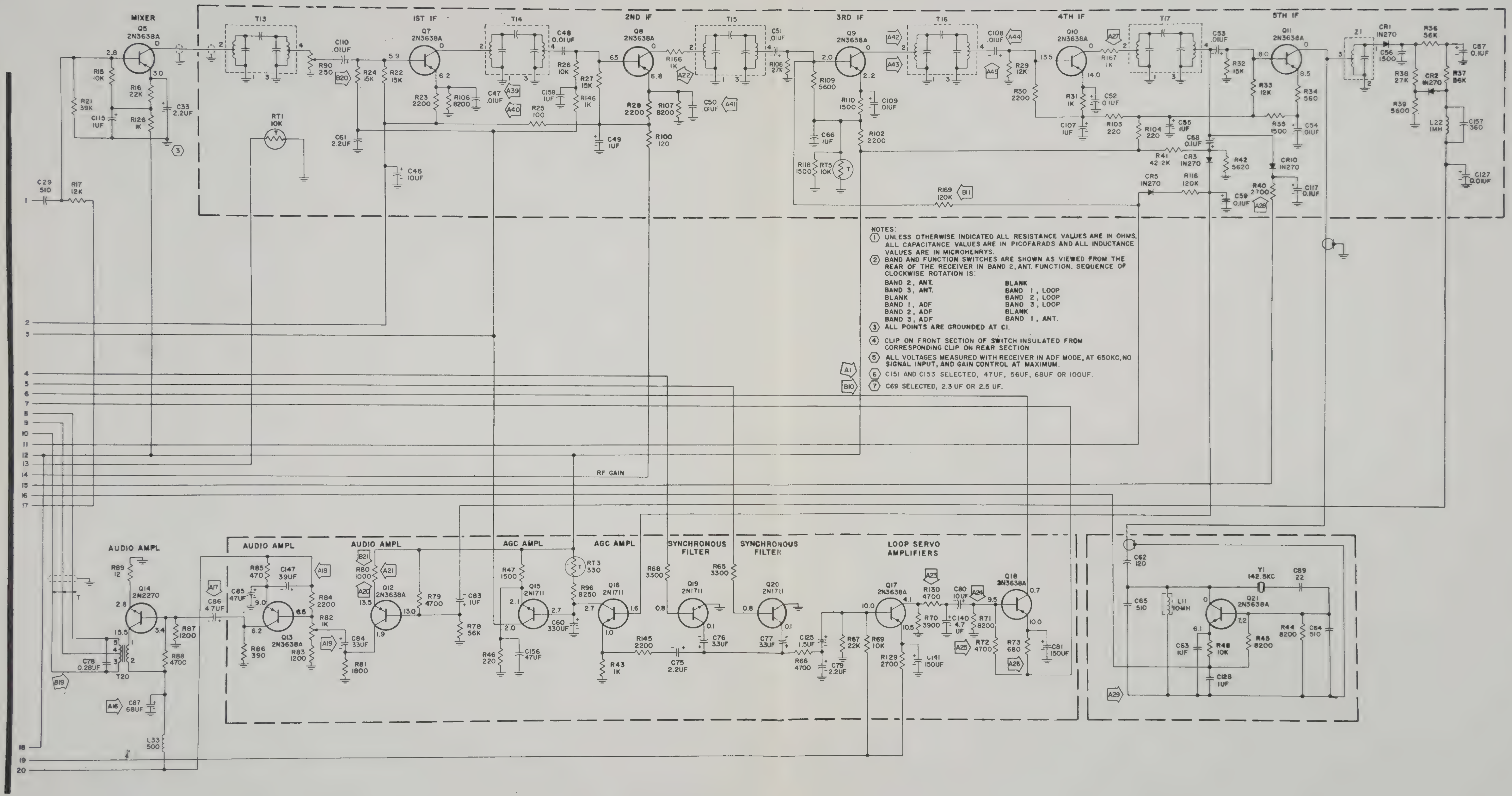
51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 3 of 4)
Figure 814A


S1F FRONT
S1P REAR
S1I REAR
S1I FRONT
T107
T108
T109
T10
T11
T12
C90 18
C91 18
C92 18
C23 1.98-12.40
C24 1.98-12.40
C25 1.98-12.40
C93 15
C94 18
C95 10
C26 1.98-12.40
C27 1.98-12.40
C28 1.98-12.40
C96 8200
C152 0.01UF
L8 10
C154 4.7
C183 15
A9
B15
R182 383
C1D
C1C
C1E
3
P/O S1J FRONT
P/O S1J FRONT
S1J REAR
B9
C34 360
C36 1.98-12.40
C35 15
L3
B8
C37 7
A12
C39 360
C38 430
C40 1.98-12.40
C41 5
L4
A13
C44 1.98-12.40
C42 1000
C45 5
L5
A14
C31 27
OSC
Q6 2N2905A
10.1
10.0
C32 1500
R20 27K
R19 2200
A15
R18 10K
C10 0.01UF
R127 1K
C124 1UF
C88 150 UF
CR11 N1775A
B6
A37
A38
A36
C113 10UF
C114 10UF
L14 5MH
L13 5MH
L12 5MH
L15 5MH
R157 68
9
33
35
34
22
15
TUNING CONT (X)
RF SENSITIVITY (CW)
RF SENSITIVIY (CCW)
RF SENSITIVIY (ARM)
TUNING METER
BFO ON/OFF
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20


MIXER
Q5
2N3638A
2.8
0
3.0
R15
10K
R16
22K
R21
39K
C115
1UF
R126
1K
C33
2.2UF
3
T13
2
4
1
3
C110
.01UF
R90
250
B20
R24
15K
R22
15K
5.9
RT1
10K
T
C61
2.2UF
C46
10UF
C29
510
R17
12K
IST IF
Q7
2N3638A
0
6.2
R23
2200
R106
8200
C47
.01UF
A39
A40
T14
C48
0.01UF
R26
10K
R27
15K
C158
1UF
R146
1K
R25
100
2ND IF
Q8
2N3638A
65
0
6.8
R166
1K
A22
R28
2200
R107
8200
C50
.01UF
A41
C49
1UF
R100
120
T15
RF GAIN
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
AUDIO AMPL
R89
12
Q14
2N2270
2.8
15.5
3.4
R87
1200
R88
4700
C78
0.28UF
T20
T
B19
A16
C87
68UF
L33
500
AUDIO AMPL
A17
C86
4.7UF
R85
470
C85
47UF
9.0
C147
39UF
A18
R84
2200
Q13
2N3638A
6.2
6.5
R82
1K
R86
390
R83
1200
AUDIO AMPL
B21
R80
1000
A21
A20
13.5
Q12
2N3638A
13.0
1.9
A19
C84
.33UF
R81
1800
R79
4700
C83
1UF
R78
56K
AGC AMPL
R47
1500
Q15
2N1711
2.1
2.7
2.0
R46
220
C156
47UF
AGC AMPL
RT3
330
T
R96
8250
C60
330UF
Q16
2N1711
2.7
1.6
1.0
R43
1K
R145
2200
C75
2.2UF
SYNCHRONOUS FILTER
R68
3300
Q19
2N1711
0.8
0.1
C76
3.3UF
R65
3300
0.8
C77
3.3UF

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 4 of 4)
Figure 814A


S1F FRONT
T107
C90 18
C23 1.98-1240
C93 15
C26 1.98-1240
T10
S1I REAR
C152 0.01UF
A9
C154 4.7
C183 15
T108
C91 18
C24 1.98-12.40
C94 18
C27 1.98-1240
T11
L8 10
S1P REAR
S1I FRONT
C92 18
C25 1.98-1240
C95 10
C28 1.98-1240
T12
T109
C96 8200
C1D
C1C
R182 383
B15
P/O S1J FRONT
C34 360
B9
C36 1.98-1240
C35 15
L3
P/O S1J FRONT
C31 27
OSC Q6 2N2905A
C88 150 UF
CR11 1N1775A
B6
A37
A38
C37 7
A12
B8
C39 360
C38 430
C40 1.98-1240
C41 5
L4
A13
C32 1500
R18 10K
R19 2200
R20 27K
A15
C10 0.01UF
C1E
C113 10UF
C114 10UF
R127 1K
C124 1UF
S1J REAR
C44 1.98-12.40
C42 1000
C45 5
L5
A14
A36
L14 5MH
L13 5MH
L12 5MH
L15 5MH
R157 68
9
33
35
34
22
15
TUNING CONT (X)
RF SENSITIVITY (CW)
RF SENSITIVIY (CCW)
RF SENSITIVIY (ARM)
TUNING METER
BFO ON/OFF
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20


MIXER
Q5 2N3638A
T13
C110 .01UF
R90 250
IST IF
Q7 2N3638A
T14
C48 0.01UF
2ND IF
Q8 2N3638A
R166 1K
T15
C51 .01UF
3RD IF
Q9 2N3638A
T16
C108 .01UF
4TH IF
Q10 2N3638A
R167 1K
T17
C53 .01UF
5TH IF
Q11 2N3638A
Z1
CR1 1N270
R36 56K
C57 0.1UF
C56 1500
R38 27K
CR2 1N270
R37 56K
R39 5600
L22 1MH
C157 360
C127 0.01UF
R15 10K
R16 22K
R21 39K
C115 1UF
R126 1K
C33 2.2UF
RT1 10K
R24 15K
R22 15K
C61 2.2UF
C46 10UF
R23 2200
R106 8200
C47 .01UF
R25 100
R26 10K
C158 1UF
R27 15K
R146 1K
C49 1UF
R28 2200
R107 8200
C50 .01UF
R100 120
R106 27K
R109 5600
R110 1500
C109 .01UF
C66 1UF
R118 1500
RT5 10K
R102 2200
R169 120K
R29 12K
R30 2200
R31 1K
C52 0.1UF
C107 1UF
R103 220
R104 220
C55 1UF
C58 0.1UF
R41 42.2K
CR3 1N270
R42 5620
CR5 1N270
R116 120K
C59 0.1UF
R32 15K
R33 12K
R34 560
R35 1500
C54 .01UF
CR10 1N270
R40 2700
C117 0.1UF
C29 510
R17 12K
RF GAIN
AUDIO AMPL
R89 12
Q14 2N2270
R87 1200
R88 4700
C78 0.28UF
T20
C87 68UF
L33 500
AUDIO AMPL
R85 470
C147 39UF
C85 47UF
C86 4.7UF
Q13 2N3638A
R84 2200
R82 1K
R86 390
R83 1200
C84 33UF
R81 1800
AUDIO AMPL
R80 1000
Q12 2N3638A
R79 4700
C83 1UF
R78 56K
AGC AMPL
R47 1500
Q15 2N1711
C60 330UF
R46 220
C156 47UF
RT3 330
R96 8250
AGC AMPL
Q16 2N1711
R43 1K
R145 2200
C75 2.2UF
SYNCHRONOUS FILTER
R68 3300
Q19 2N1711
C76 33UF
SYNCHRONOUS FILTER
R65 3300
Q20 2N1711
C77 33UF
LOOP SERVO AMPLIFIERS
Q17 2N3638A
R130 4700
C80 10UF
Q18 2N3638A
C125 1.5UF
R67 22K
R69 10K
R66 4700
C79 2.2UF
R129 2700
C141 150UF
R70 3900
C140 4.7 UF
R71 8200
R72 4700
R73 680
C81 150UF
C62 120
C65 510
L11 40MH
Y1 142.5KC
C89 22
Q21 2N3638A
C63 1UF
R48 10K
C128 1UF
R45 8200
R44 8200
C64 510

NOTES:

① UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

② BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:

BAND 2, ANT.
BAND 3, ANT.
BLANK
BAND 1, ADF
BAND 2, ADF
BAND 3, ADF
BLANK
BAND 1, LOOP
BAND 2, LOOP
BAND 3, LOOP
BLANK
BAND 1, ANT.

③ ALL POINTS ARE GROUNDED AT C1.

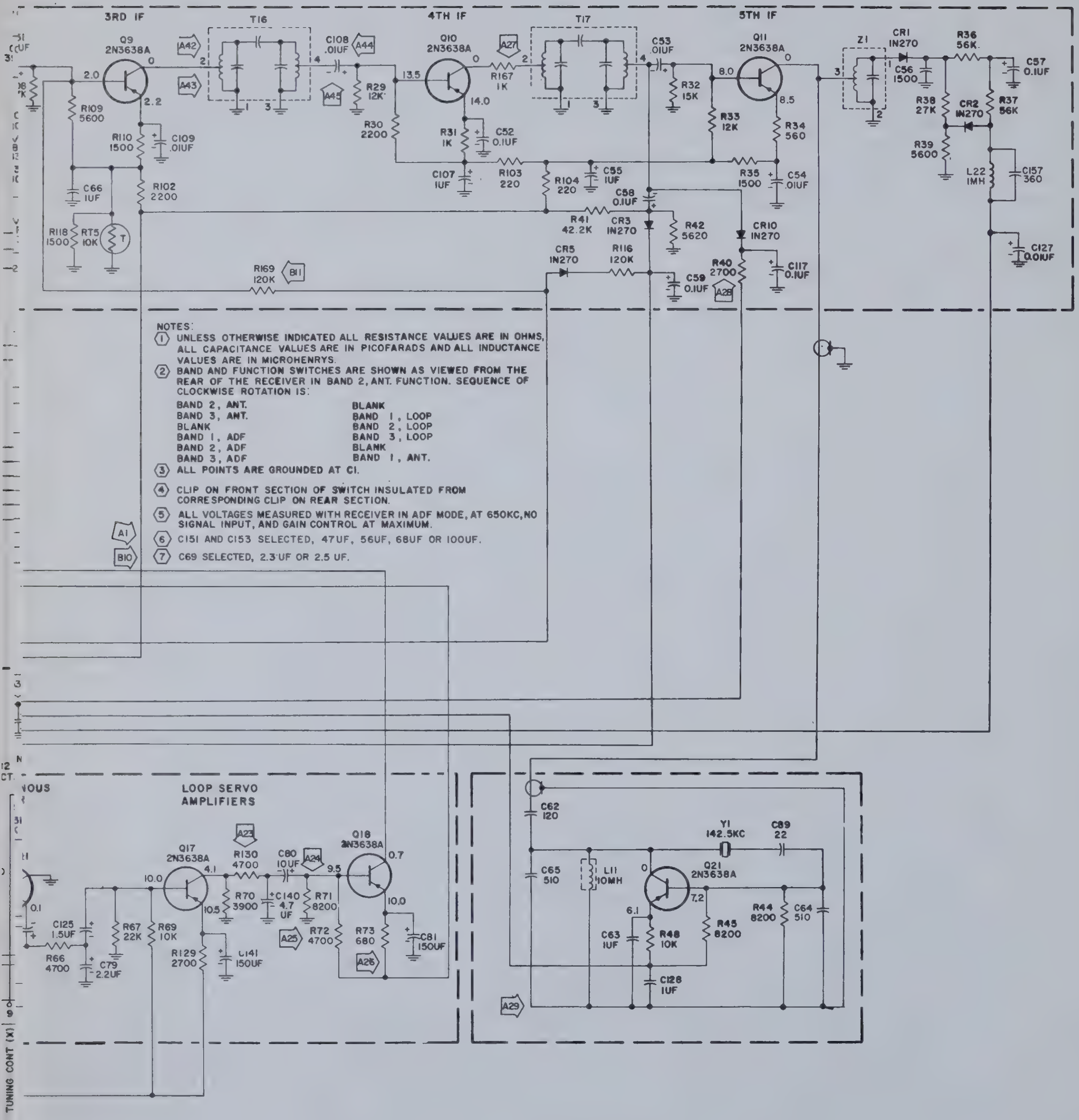
④ CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.

⑤ ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.

⑥ C151 AND C153 SELECTED, 47UF, 56UF, 68UF OR 100UF.

⑦ C69 SELECTED, 2.3 UF OR 2.5 UF.

51Y-4A ADF Receiver, MCN 1084 and Above, Schematic Diagram (Sheet 4 of 4)
Figure 814A


3RD IF
Q9
2N3638A
2.0
0
2.2
A42
A43
T16
C108
.01UF
A44
A45
R29
12K
R109
5600
R110
1500
C109
.01UF
C66
1UF
R102
2200
R118
1500
RT5
10K
R169
120K
B11
4TH IF
Q10
2N3638A
13.5
0
14.0
A27
R167
1K
T17
R30
2200
R31
1K
C52
0.1UF
C107
1UF
R103
220
R104
220
C55
1UF
R41
42.2K
CR3
1N270
CR5
1N270
R116
120K
C59
0.1UF
5TH IF
Q11
2N3638A
C53
.01UF
8.0
0
8.5
R32
15K
R33
12K
R34
560
R35
1500
C54
.01UF
C58
0.1UF
R42
5620
CR10
1N270
R40
2700
C117
0.1UF
A28
Z1
CR1
1N270
C56
1500
R36
56K
C57
0.1UF
R38
27K
CR2
1N270
R37
56K
R39
5600
L22
1MH
C157
360
C127
0.01UF
A1
B10
LOOP SERVO
AMPLIFIERS
Q17
2N3638A
A23
R130
4700
C80
10UF
A24
Q18
2N3638A
10.0
4.1
10.5
9.5
0.7
10.0
R70
3900
C140
4.7
UF
R71
8200
R72
4700
A25
R73
680
C81
150UF
A26
C125
1.5UF
R67
22K
R69
10K
R66
4700
C79
2.2UF
R129
2700
C141
150UF
TUNING CONT (X)
C62
120
C65
510
L11
10MH
Y1
142.5KC
C89
22
Q21
2N3638A
0
7.2
6.1
C63
1UF
R48
10K
R45
8200
R44
8200
C64
510
C128
1UF
A29

NOTES:

① UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS.

② BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:

BAND 2, ANT.
BAND 3, ANT.
BLANK
BAND 1, ADF
BAND 2, ADF
BAND 3, ADF
BLANK
BAND 1, LOOP
BAND 2, LOOP
BAND 3, LOOP
BLANK
BAND 1, ANT.

③ ALL POINTS ARE GROUNDED AT C1.

④ CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.

⑤ ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.

⑥ C151 AND C153 SELECTED, 47UF, 56UF, 68UF OR 100UF.

⑦ C69 SELECTED, 2.3 UF OR 2.5 UF.

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	B1	Changed C131 from 2000 to 3000 pF.	Correct drawing error.		All
3	B2	Changed R92 from 8 to 8.2 ohms.	Correct drawing error.		All
3	B3	Changed R94 from 27 kilohms to 2700 ohms.	Correct drawing error.		All
3	B4	Changed type number of CR4 from .41N17Z2 to .4M18Z5.	Correct drawing error.		All
3	B5	Deleted R165, 560 ohms	Design change for improved operation.		MCN 9428 and above.
3	B6	Changed C37 from 10 to 7 pF.	Design change for improved operation.		MCN 8069 and above.
3	B7	Changed C37, 15 pF to C35, 15 pF.	Correct schematic error.		All
3	B7	Deleted C37 from L4-1 to L4-3.	Correct schematic error.		All
2	B8	Deleted value from C69 and added note 7.	Design change for improved operation.	33	MCN 4237 and above.
4	B9	Added R169 120 kilohms.	Eliminate "thump" in audio output	35	MCN 9075 and above.

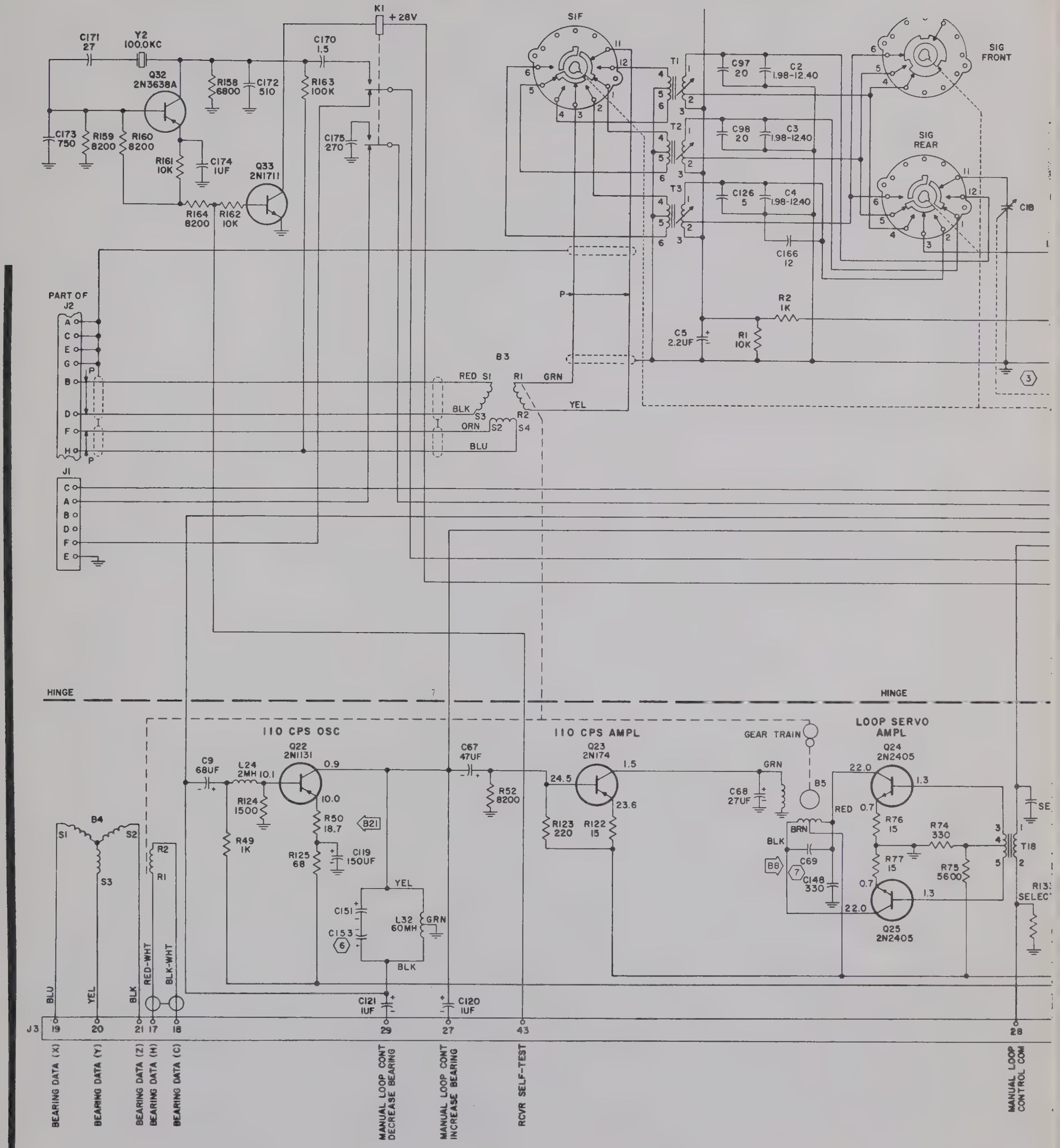
51Y-4A ADF Receiver, Collins Part Number 522-2587-013,
Schematic Diagram (Sheet 1 of 4)
Figure 814B

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
			when 614L-8 mode switch is changed from ADF to ANT position.		
2	B10	Changed Q28 and Q29 from type pnp to type npn.	Correct schematic error.		All
3	B11	Added R170, 4700 ohms.	Design change for improved operation.		MCN 11900 and above.
3	B12	Added R171, 560 ohms.	Design change for improved operation.		MCN 11900 and above.
3	B13	Added R183, 390 ohms. Changed R183 from 390 to 383 ohms.	Design change for improved operation.		MCN 12616 through 12917 MCN 12918 and above.
3	B14	Added R182 390 ohms. Changed R182 from 390 to 383 ohms.	Design change for improved operation.		MCN 12616 through 12917 MCN 12918 and above.
3	B15	Added C182 15 pF.	Design change for improved operation.		MCN 12616 and above.
3	B16	Added C183 15 pF.	Design change for improved operation.		MCN 12616 and above.

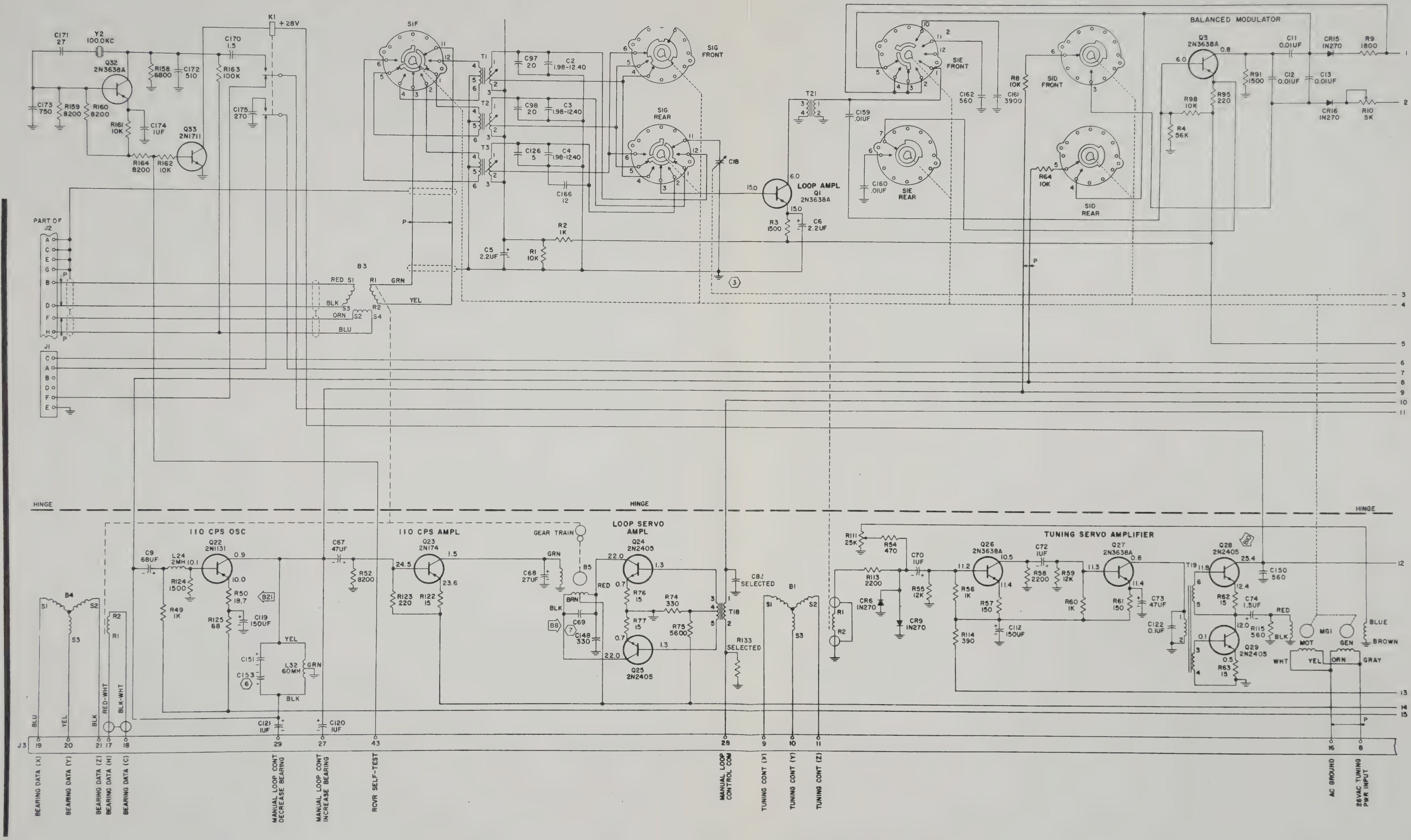
51Y-4A ADF Receiver, Collins Part Number 522-2587-013,
Schematic Diagram (Sheet 1A of 4)
Figure 814B

SHEET	REVISION IDENTIFICATION	DESCRIPTION OF REVISION AND REASON FOR CHANGE		SERVICE BULLETIN	EFFECTIVITY
3	B17	Changed C111 from 0.33 to 0.28 μF.	Improve audio frequency response.		
4	B18	Changed C78 from 0.33 to 0.28 μF.	Improve audio frequency response.		
4	B19	Changed R24 from 12 to 15 kilohms.	Improve receiver gain.		MCN 1084 and above.
4	B20	Changed R80 from 1200 to 1000 ohms.	Increase gain of audio amplifier.		MCN 8821 and above.
2	B21	Changed R50 from 22 to 18.7 ohms.	Design change for improved operation.		MCN 11508 and above.

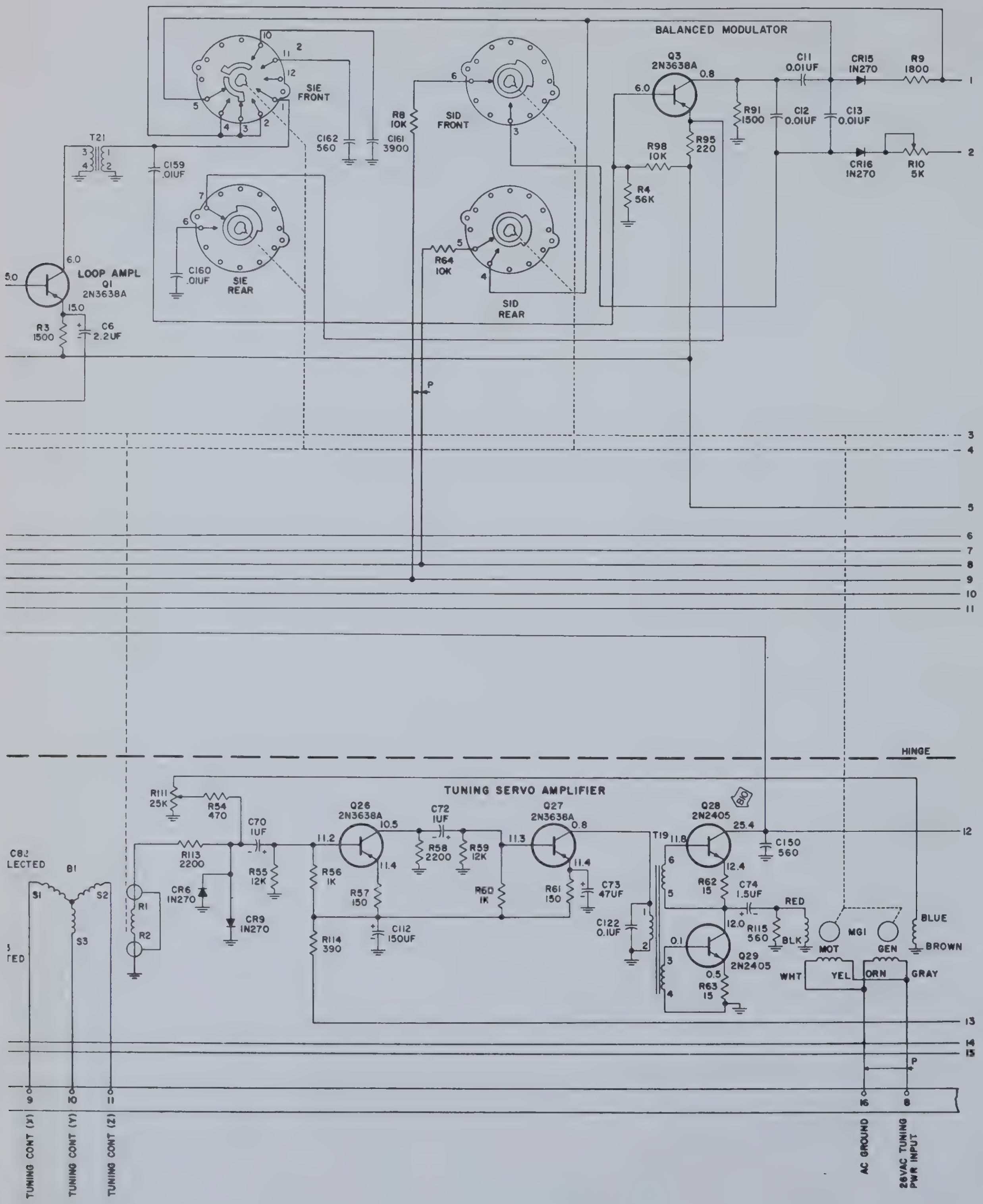
51Y-4A ADF Receiver, Collins Part Number 522-2587-013,
Schematic Diagram (Sheet 1B of 4)
Figure 814B

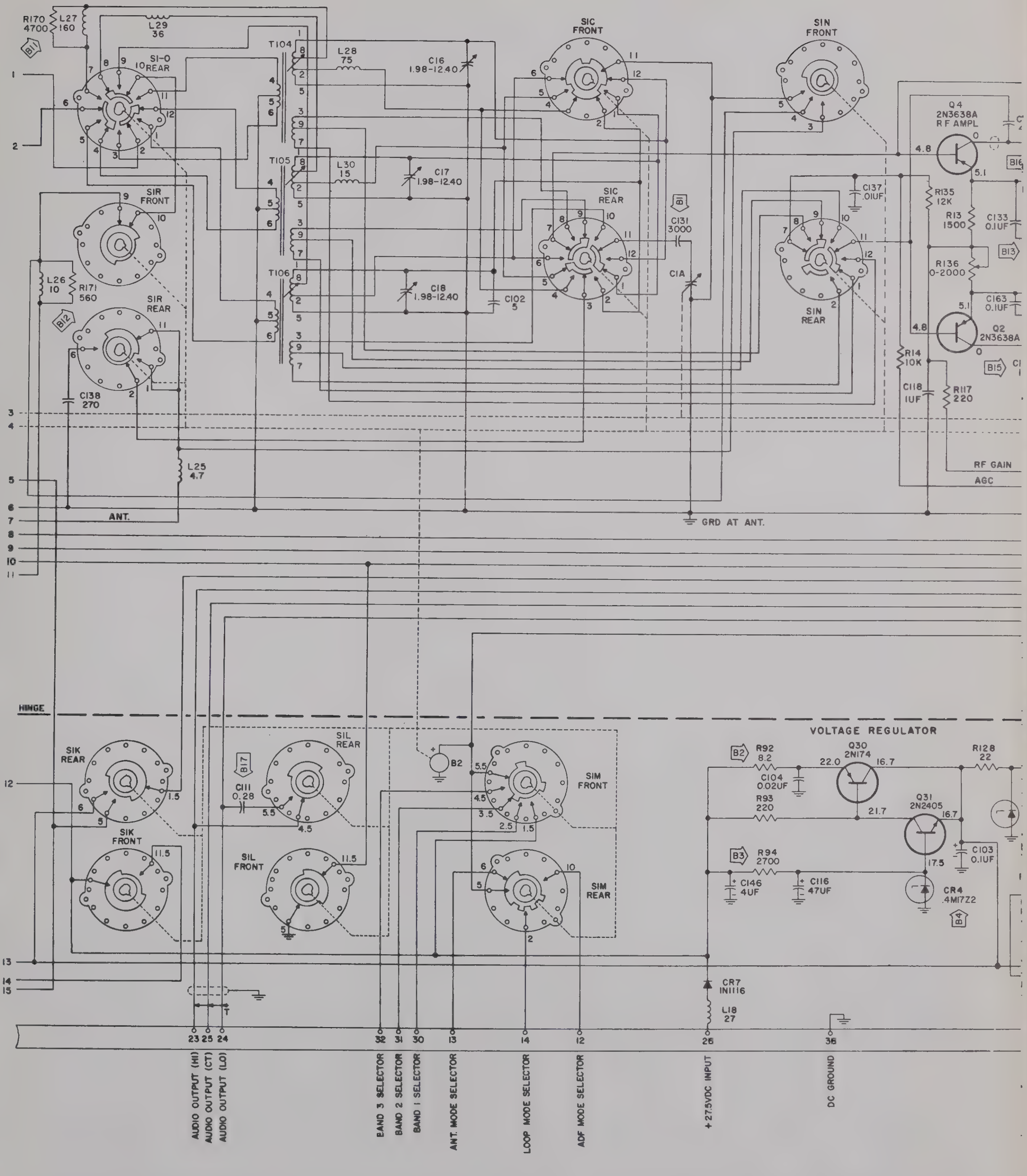

C171 27
Y2 100.0KC
Q32 2N3638A
R158 6800
C172 510
C170 1.5
R163 100K
K1 +28V
C173 750
R159 8200
R160 8200
R161 10K
C174 1UF
Q33 2N1711
C175 270
R164 8200
R162 10K
S1F
T1
T2
T3
C97 20
C2 1.98-12.40
C98 20
C3 1.98-12.40
C126 5
C4 1.98-12.40
C166 12
SIG FRONT
SIG REAR
C18
R2 1K
R1 10K
C5 2.2UF
P
3
PART OF J2
A
C
E
G
B
D
F
H
J1
B3
RED S1
R1 GRN
BLK
S3
ORN
S2
R2
S4
BLU
YEL
HINGE
110 CPS OSC
Q22 2N1131
C9 68UF
L24 2MH
10.1
0.9
10.0
R124 1500
R49 1K
R50 18.7
R125 68
C119 150UF
B21
C151
C153
6
L32 60MH
YEL
GRN
BLK
C121 1UF
C67 47UF
R52 8200
C120 1UF
110 CPS AMPL
Q23 2N174
24.5
1.5
23.6
R123 220
R122 15
GEAR TRAIN
GRN
C68 27UF
B5
RED
BRN
BLK
C69
B8
7
C148 330
LOOP SERVO AMPL
Q24 2N2405
22.0
1.3
0.7
R76 15
R74 330
R77 15
R75 5600
Q25 2N2405
T18
SE
R13
SELECT
B4
S1
S2
S3
R2
R1
BLU
YEL
BLK
RED-WHT
BLK-WHT
J3
19
20
21
17
18
29
27
43
28
BEARING DATA (X)
BEARING DATA (Y)
BEARING DATA (Z)
BEARING DATA (H)
BEARING DATA (C)
MANUAL LOOP CONT DECREASE BEARING
MANUAL LOOP CONT INCREASE BEARING
RCVR SELF-TEST
MANUAL LOOP CONTROL COM

51Y-4A ADF Receiver, Collins Part Number 522-2587-013, Schematic Diagram (Sheet 2 of 4)
Figure 814B

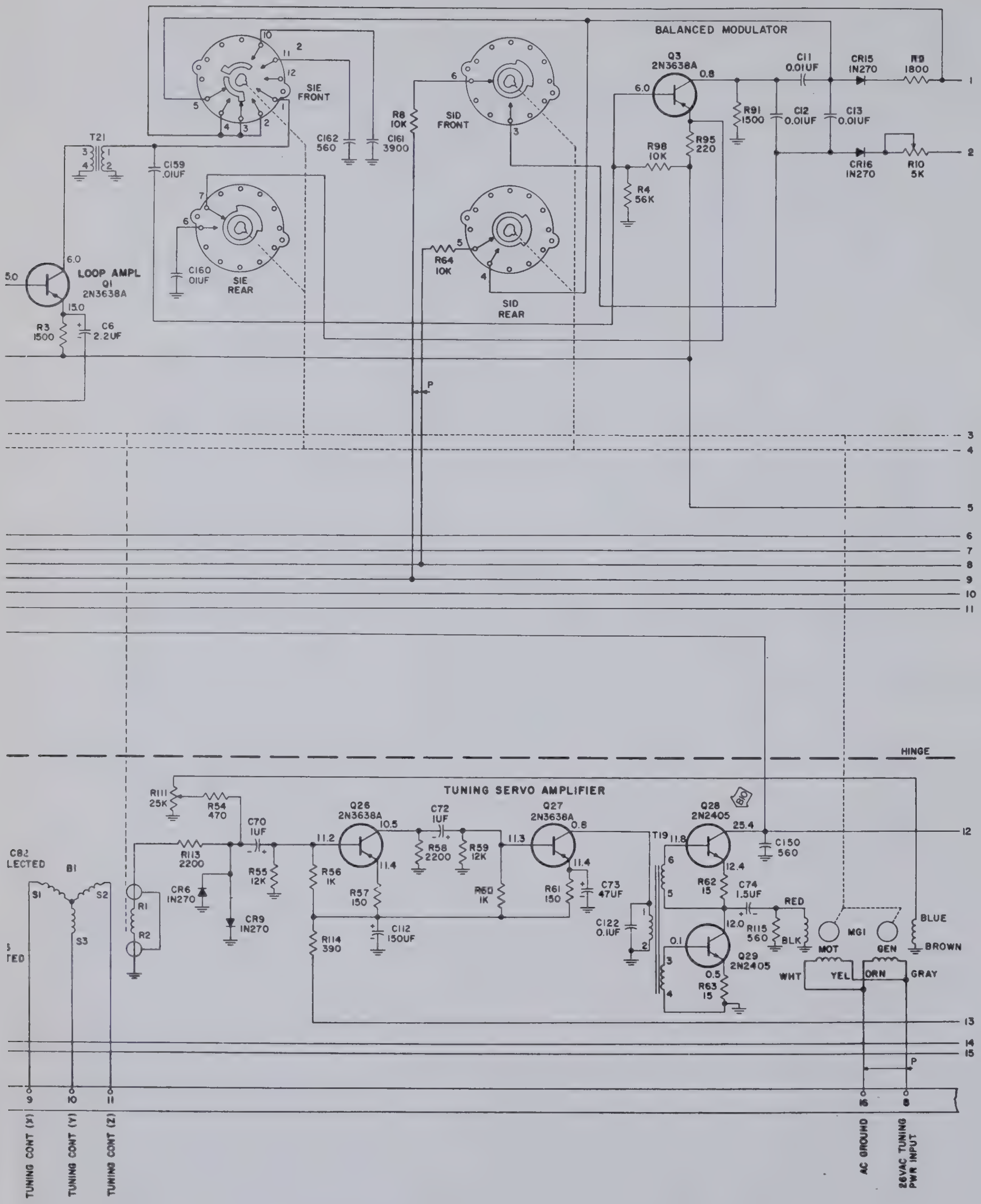

BALANCED MODULATOR
LOOP AMPL Q1 2N3638A
SIF
SIG FRONT
SIG REAR
SIE FRONT
SIE REAR
SID FRONT
SID REAR
K1 +28V
Q32 2N3638A
Q33 2N1711
Y2 100.0KC
PART OF J2
J1
B3
HINGE
110 CPS OSC
Q22 2N1131
110 CPS AMPL
Q23 2N174
LOOP SERVO AMPL
Q24 2N2405
Q25 2N2405
GEAR TRAIN
B5
T18
B1
B4
TUNING SERVO AMPLIFIER
Q26 2N3638A
Q27 2N3638A
Q28 2N2405
Q29 2N2405
T19
MG1
MOT
GEN
J3
BEARING DATA (X)
BEARING DATA (Y)
BEARING DATA (Z)
BEARING DATA (H)
BEARING DATA (C)
MANUAL LOOP CONT DECREASE BEARING
MANUAL LOOP CONT INCREASE BEARING
RCVR SELF-TEST
MANUAL LOOP CONTROL COM
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT

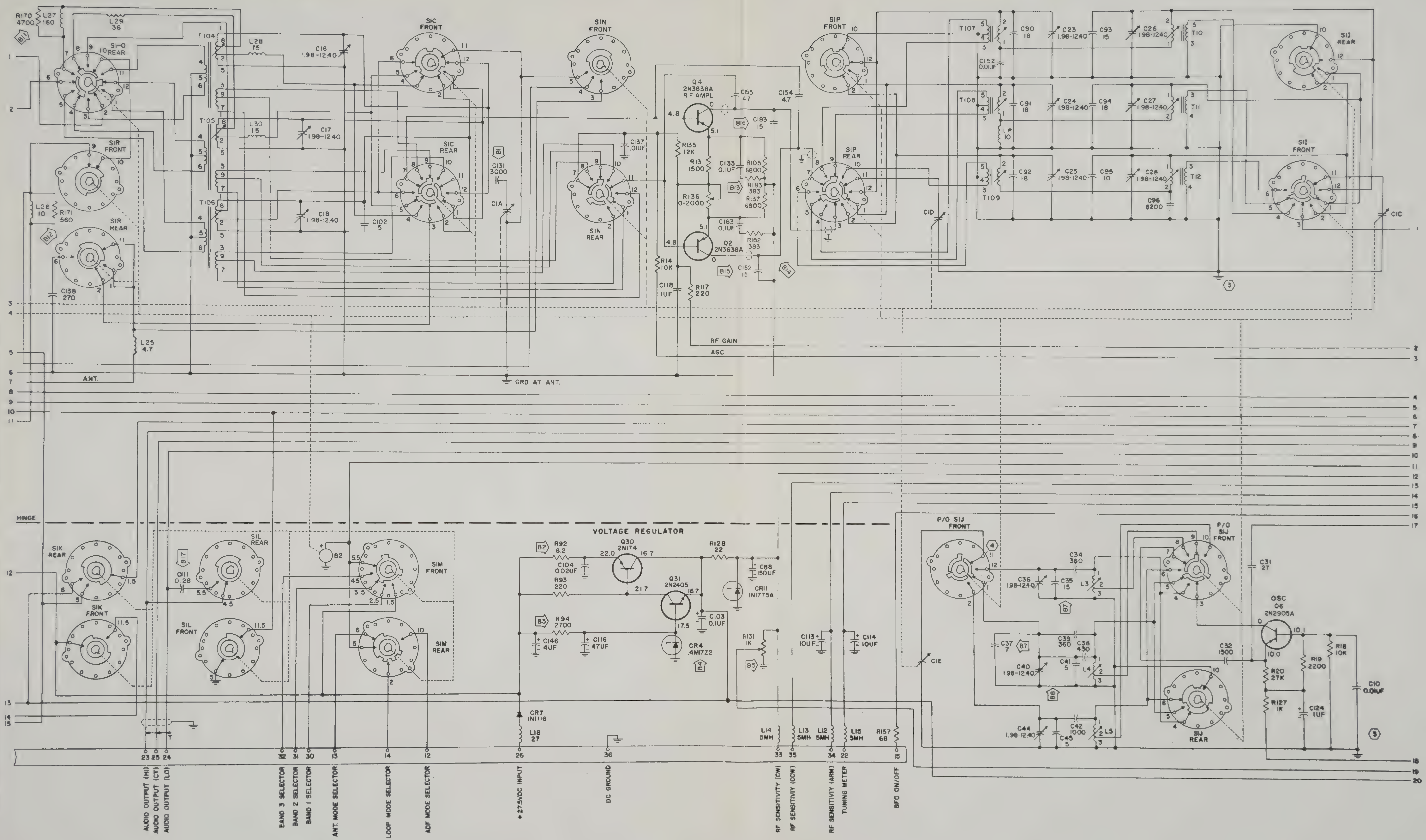
51Y-4A ADF Receiver, Collins Part Number 522-2587-013, Schematic Diagram (Sheet 2 of 4)
Figure 814B


BALANCED MODULATOR
Q3
2N3638A
0.8
6.0
C11
0.01UF
CR15
1N270
R9
1800
1
R91
1500
C12
0.01UF
C13
0.01UF
R95
220
R98
10K
CR16
1N270
R10
5K
2
R4
56K
S1E
FRONT
10
2
11
12
5
4
3
2
1
C162
560
C161
3900
R8
10K
6
S1D
FRONT
3
T21
3
4
1
2
C159
.01UF
S1E
REAR
7
6
C160
.01UF
R64
10K
5
4
S1D
REAR
5.0
6.0
LOOP AMPL
Q1
2N3638A
15.0
R3
1500
C6
2.2UF
P
3
4
5
6
7
8
9
10
11
HINGE
TUNING SERVO AMPLIFIER
R111
25K
R54
470
C70
1UF
R113
2200
CR6
1N270
R55
12K
CR9
1N270
R1
R2
Q26
2N3638A
10.5
11.2
11.4
R56
1K
R57
150
R114
390
C112
150UF
C72
1UF
R58
2200
R59
12K
Q27
2N3638A
0.8
11.3
11.4
R60
1K
R61
150
C73
47UF
T19
6
5
1
2
3
4
C122
0.1UF
Q28
2N2405
11.8
25.4
12.4
R62
15
C74
1.5UF
12.0
0.1
Q29
2N2405
0.5
R63
15
C150
560
12
R115
560
RED
BLK
MG1
MOT
GEN
BLUE
BROWN
WHT
YEL
ORN
GRAY
13
14
15
P
C82
LECTED
B1
S1
S2
S3
TED
9
10
11
16
8
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT

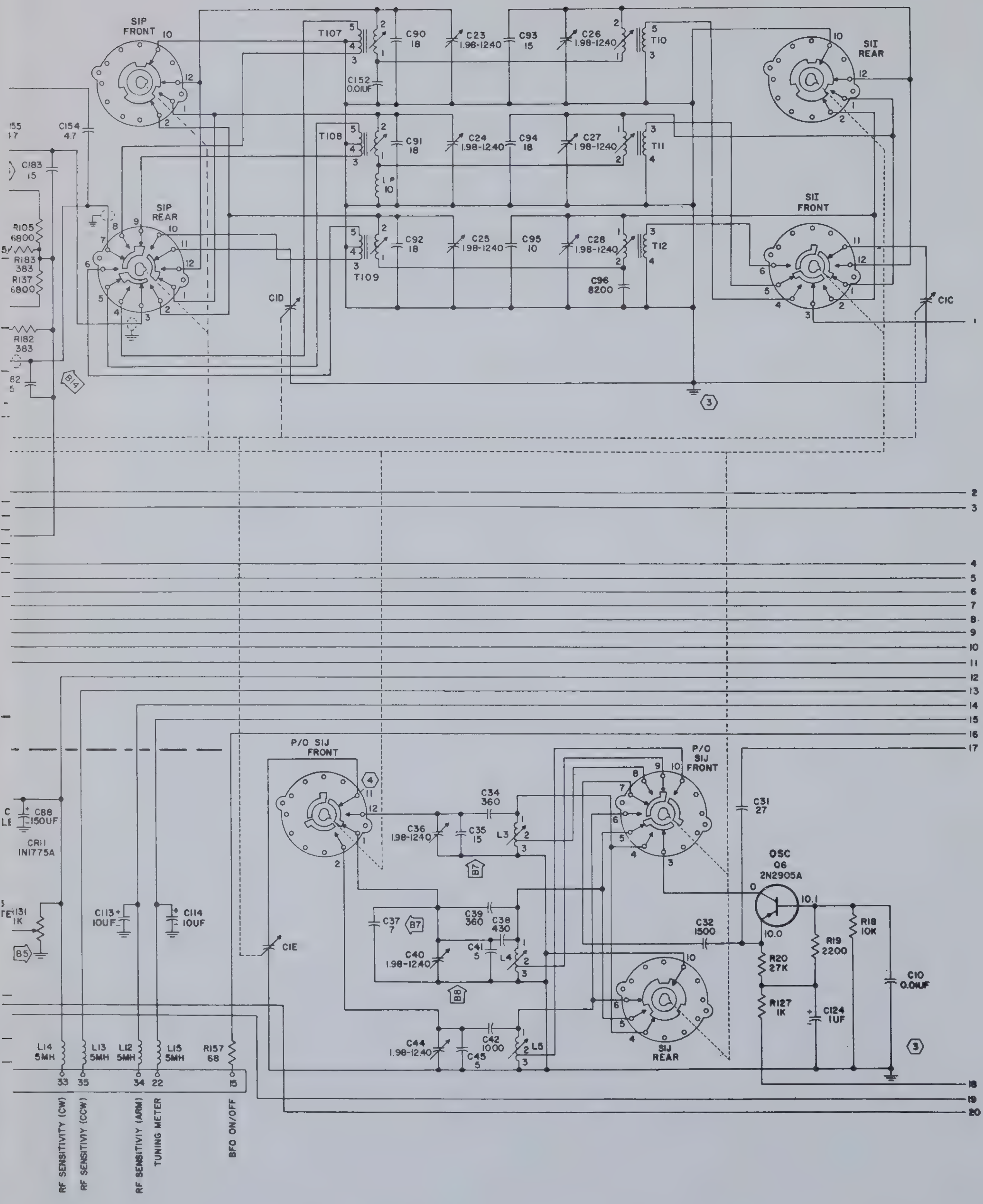

R170 4700
L27 160
L29 36
B11
S1-0 REAR
T104
L28 75
C16 1.98-12.40
S1C FRONT
S1N FRONT
Q4 2N3638A RF AMPL
4.8
5.1
B16
T105
L30 15
C17 1.98-12.40
S1R FRONT
S1C REAR
B1
C131 3000
C137 .01UF
R135 12K
R13 1500
C133 0.1UF
B13
L26 10
R171 560
B12
S1R REAR
T106
C18 1.98-12.40
C102 5
C1A
S1N REAR
R136 0-2000
C163 0.1UF
Q2 2N3638A
C138 270
R14 10K
C118 1UF
R117 220
B15
L25 4.7
ANT.
RF GAIN
AGC
GRD AT ANT.
HINGE
S1K REAR
S1K FRONT
B17
C111 0.28
S1L REAR
S1L FRONT
B2
S1M FRONT
S1M REAR
VOLTAGE REGULATOR
R92 8.2
C104 0.02UF
R93 220
Q30 2N174
22.0
16.7
21.7
Q31 2N2405
R128 22
B3
R94 2700
C146 4UF
C116 47UF
C103 0.1UF
17.5
CR4 .4M17Z2
B4
CR7 1N1116
L18 27
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
23 25 24
32 31 30
13
14
12
26
38
AUDIO OUTPUT (HI)
AUDIO OUTPUT (CT)
AUDIO OUTPUT (LO)
BAND 3 SELECTOR
BAND 2 SELECTOR
BAND 1 SELECTOR
ANT. MODE SELECTOR
LOOP MODE SELECTOR
ADF MODE SELECTOR
+27.5VDC INPUT
DC GROUND

51Y-4A ADF Receiver, Collins Part Number 522-2587-013, Schematic Diagram (Sheet 3 of 4)
Figure 814B

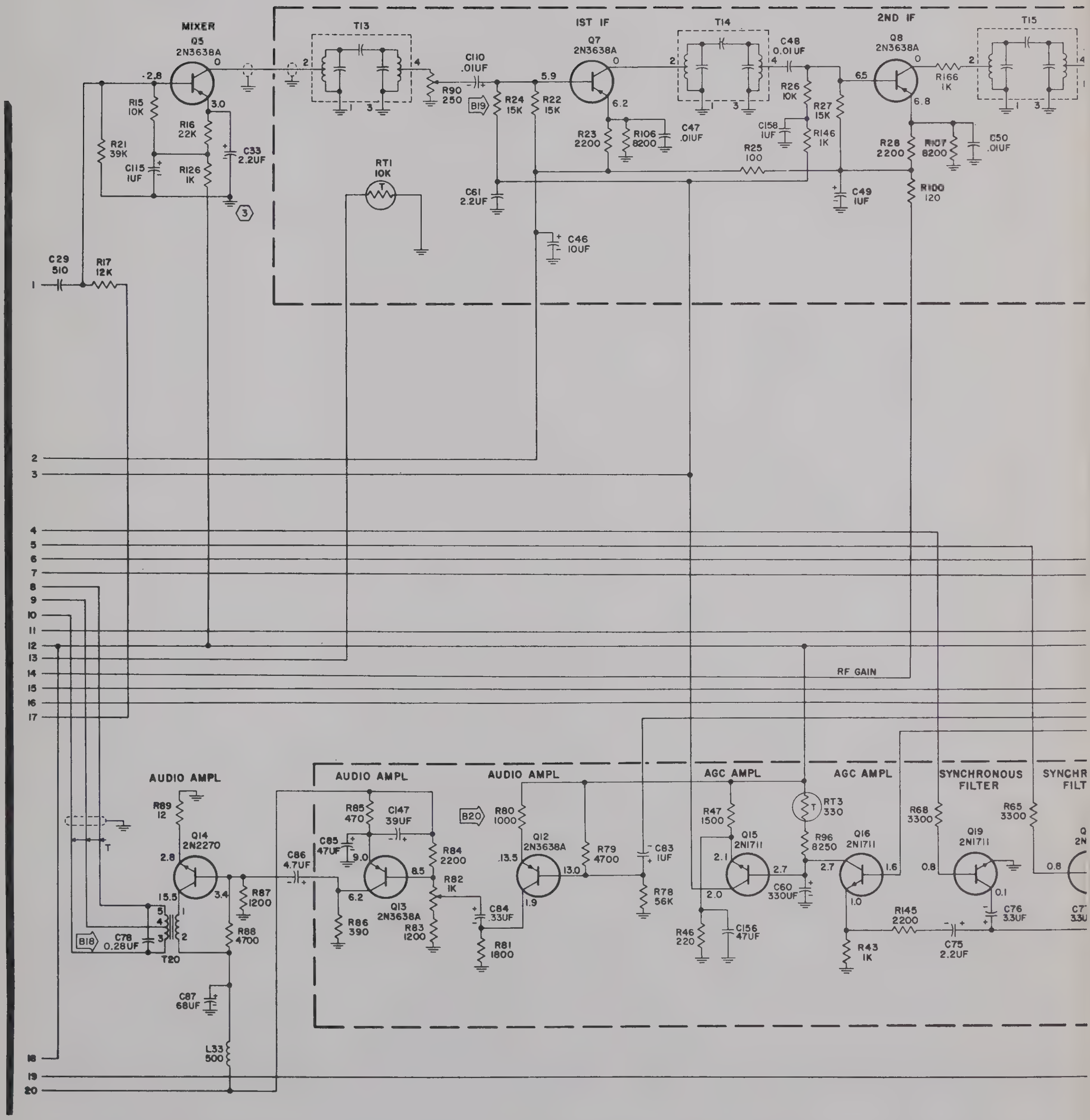

BALANCED MODULATOR
Q3
2N3638A
0.8
6.0
C11
0.01UF
CR15
1N270
R9
1800
R91
1500
C12
0.01UF
C13
0.01UF
R98
10K
R95
220
R4
56K
CR16
1N270
R10
5K
S1E
FRONT
S1E
REAR
S1D
FRONT
S1D
REAR
C162
560
C161
3900
R8
10K
R64
10K
T21
C159
.01UF
C160
.01UF
LOOP AMPL
Q1
2N3638A
5.0
6.0
15.0
R3
1500
C6
2.2UF
P
HINGE
TUNING SERVO AMPLIFIER
R111
25K
R54
470
C70
1UF
R113
2200
R55
12K
CR6
1N270
CR9
1N270
R1
R2
C82
LECTED
B1
S1
S2
S3
TED
Q26
2N3638A
11.2
10.5
11.4
R56
1K
R57
150
R114
390
C112
150UF
C72
1UF
R58
2200
R59
12K
Q27
2N3638A
11.3
0.8
11.4
R60
1K
R61
150
C73
47UF
T19
C122
0.1UF
Q28
2N2405
11.8
25.4
12.4
R62
15
C74
1.5UF
12.0
C150
560
Q29
2N2405
0.1
0.5
R63
15
R115
560
RED
BLK
MG1
MOT
GEN
BLUE
BROWN
WHT
YEL
ORN
GRAY
B10
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
9
10
11
16
8
TUNING CONT (X)
TUNING CONT (Y)
TUNING CONT (Z)
AC GROUND
26VAC TUNING PWR INPUT


R170 4700
L27 160
L29 36
B11
S1-O REAR
T104
L28 75
C16 1.98-1240
SIC FRONT
SIN FRONT
Q4 2N3638A RF AMPL
C155 47
C154 47
SIP FRONT
T107
C90 18
C23 1.98-1240
C93 15
C26 1.98-1240
T10
SII REAR
C152 0.01UF
T108
C91 18
C24 1.98-1240
C94 18
C27 1.98-1240
T11
L P 10
T105
L30 15
C17 1.98-1240
SIR FRONT
SIC REAR
B10
C131 3000
C137 .01UF
R135 12K
R13 1500
C133 0.1UF
R105 6800
B16
C183 15
B13
R183 383
R137 6800
R136 0-2000
SIP REAR
C92 18
C25 1.98-1240
C95 10
C28 1.98-1240
T12
T109
C96 8200
SII FRONT
L26 10
R171 560
T106
C18 1.98-1240
C102 5
C1A
SIN REAR
C163 0.1UF
R182 383
Q2 2N3638A
C1D
C1C
B12
SIR REAR
B15
C182 15
B14
C138 270
R14 10K
C118 1UF
R117 220
L25 4.7
RF GAIN
AGC
ANT.
GRD AT ANT.
HINGE
SIK REAR
B17
C111 0.28
SIL REAR
B2
SIM FRONT
VOLTAGE REGULATOR
B2
R92 8.2
Q30 2N174
C104 0.02UF
R128 22
C88 150UF
R93 220
Q31 2N2405
CR11 1N1775A
B3
R94 2700
C103 0.1UF
P/O SIJ FRONT
C34 360
P/O SIJ FRONT
C36 1.98-1240
C35 15
L3
B7
C31 27
SIK FRONT
SIL FRONT
SIM REAR
C146 4UF
C116 47UF
CR4 .4M17Z2
B4
R131 1K
B5
C113 10UF
C114 10UF
C1E
C37 7
B7
C39 360
C38 430
C40 1.98-1240
C41 5
L4
OSC Q6 2N2905A
C32 1500
R18 10K
R19 2200
R20 27K
B8
C10 0.01UF
R127 1K
C124 1UF
SIJ REAR
CR7 1N1116
L18 27
C44 1.98-1240
C42 1000
C45 5
L5
L14 5MH
L13 5MH
L12 5MH
L15 5MH
R157 68
AUDIO OUTPUT (HI)
AUDIO OUTPUT (CT)
AUDIO OUTPUT (LO)
BAND 3 SELECTOR
BAND 2 SELECTOR
BAND 1 SELECTOR
ANT. MODE SELECTOR
LOOP MODE SELECTOR
ADF MODE SELECTOR
+27.5VDC INPUT
DC GROUND
RF SENSITIVITY (CW)
RF SENSITIVITY (CCW)
RF SENSITIVITY (ARM)
TUNING METER
BFO ON/OFF
23 25 24
32 31 30 13 14 12 26 36 33 35 34 22 15

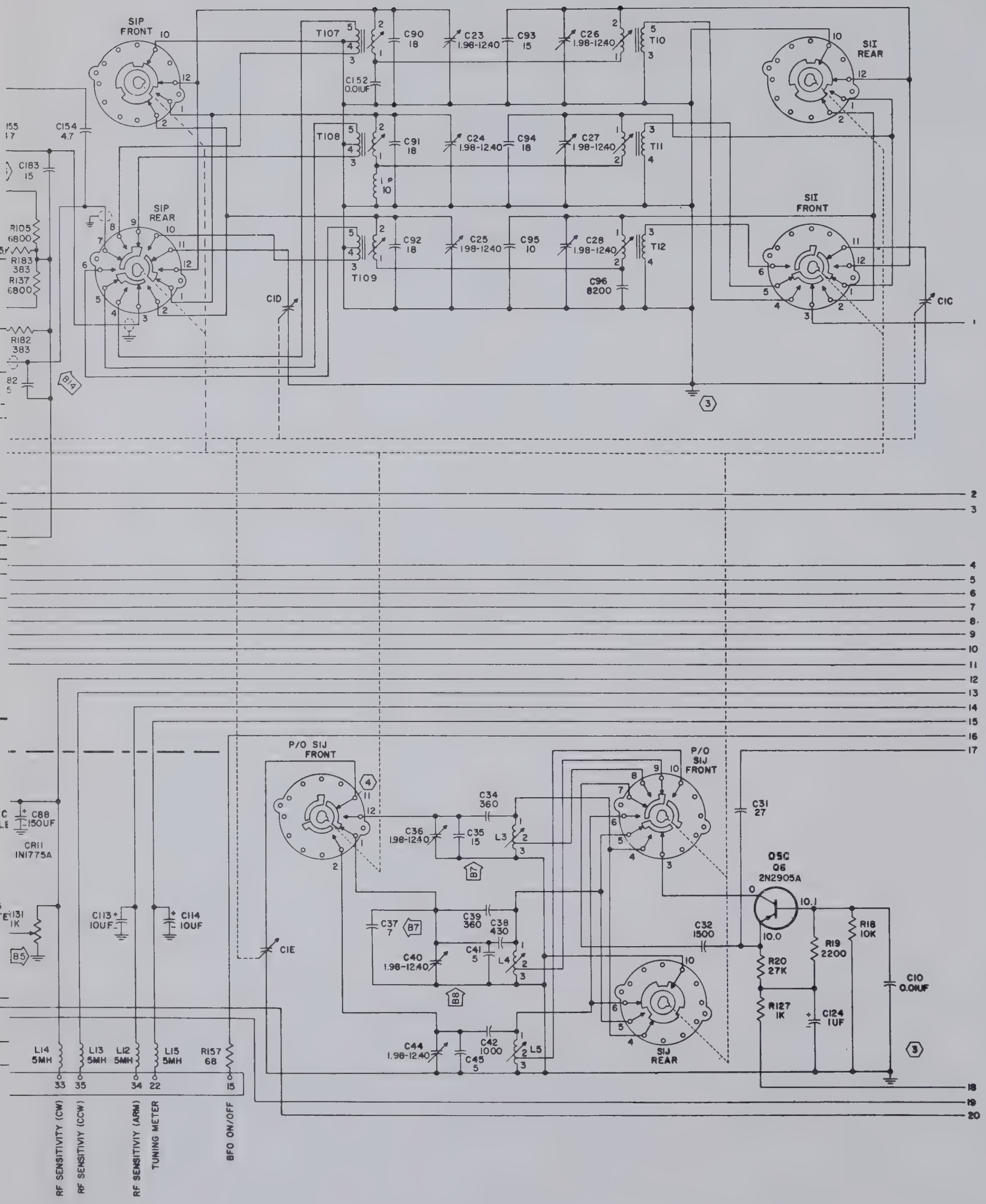
51Y-4A ADF Receiver, Collins Part Number 522-2587-013, Schematic Diagram (Sheet 3 of 4)
Figure 814B

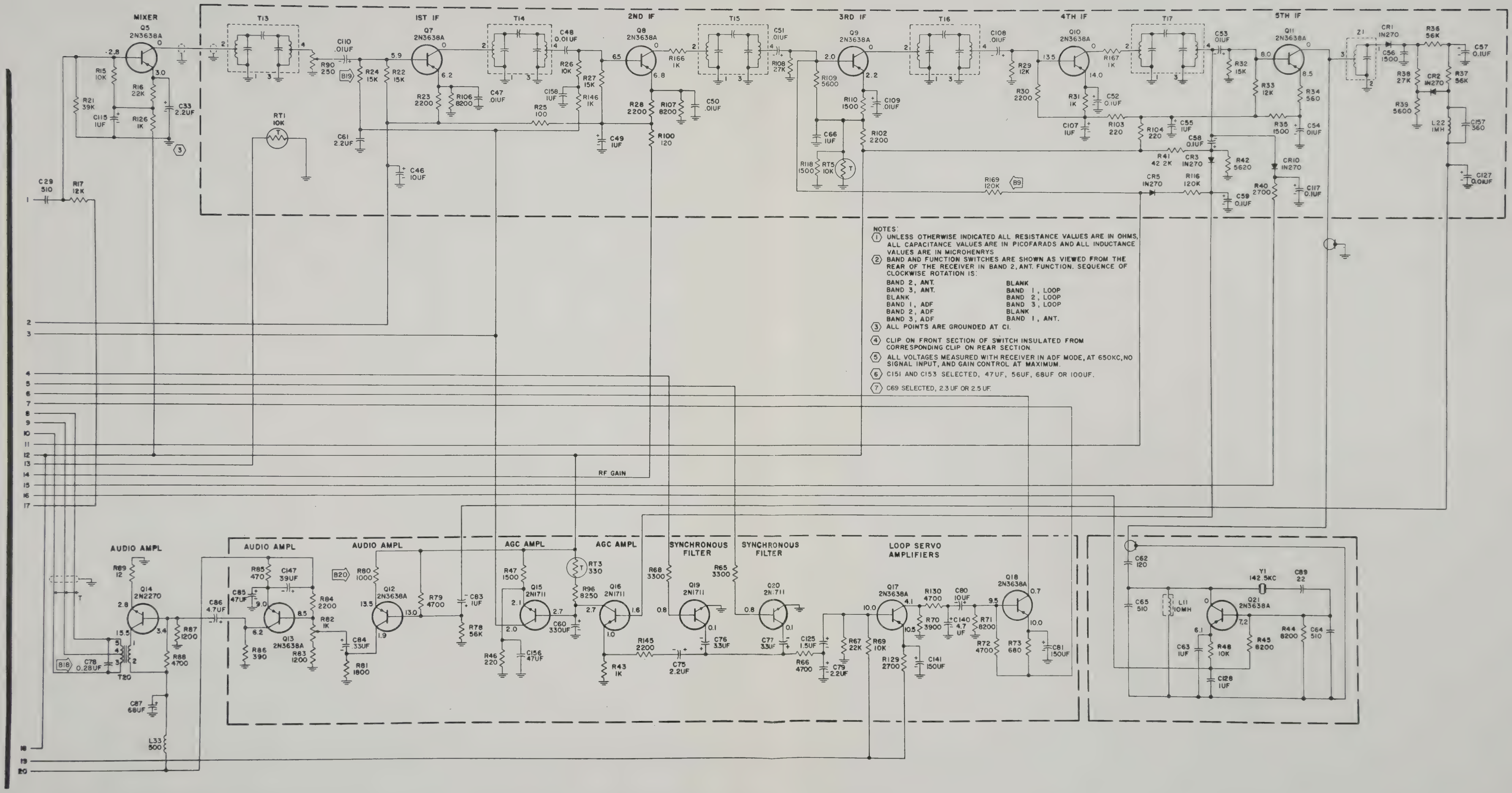


SIP FRONT
T107
C90 18
C23 1.98-1240
C93 15
C26 1.98-1240
T10
SII REAR
C152 0.01UF
155 47
C154 47
T108
C91 18
C24 1.98-1240
C94 18
C27 1.98-1240
T11
C183 15
L P 10
SII FRONT
SIP REAR
R105 6800
R183 383
R137 6800
C92 18
C25 1.98-1240
C95 10
C28 1.98-1240
T12
T109
C96 8200
C1D
C1C
R182 383
82 5
B14
3
P/O SIJ FRONT
4
C34 360
C36 1.98-1240
C35 15
L3
B7
P/O SIJ FRONT
C31 27
C88 150UF
CR11 IN1775A
OSC Q6 2N2905A
C39 360
C38 430
C37 7
B7
C32 1500
R131 1K
C113 10UF
C114 10UF
C40 1.98-1240
C41 5
L4
R18 10K
R19 2200
R20 27K
C1E
B5
B8
C10 0.01UF
R127 1K
C124 1UF
C44 1.98-1240
C42 1000
C45 5
L5
SIJ REAR
3
L14 5MH
L13 5MH
L12 5MH
L15 5MH
R157 68
33
35
34
22
15
RF SENSITIVITY (CW)
RF SENSITIVITY (CCW)
RF SENSITIVITY (ARM)
TUNING METER
BFO ON/OFF
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20


MIXER
Q5
2N3638A
T13
IST IF
Q7
2N3638A
T14
2ND IF
Q8
2N3638A
T15
-2.8
0
3.0
R15
10K
R16
22K
R21
39K
C115
1UF
R126
1K
C33
2.2UF
3
C110
.01UF
R90
250
B19
R24
15K
R22
15K
5.9
6.2
R23
2200
R106
8200
C47
.01UF
C48
0.01UF
R26
10K
R27
15K
C158
1UF
R146
1K
R25
100
65
6.8
R166
1K
R28
2200
R107
8200
C50
.01UF
R100
120
C49
1UF
RT1
10K
C61
2.2UF
C46
10UF
C29
510
R17
12K
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
RF GAIN
AUDIO AMPL
AUDIO AMPL
AUDIO AMPL
AGC AMPL
AGC AMPL
SYNCHRONOUS FILTER
SYNCHR FILT
R89
12
Q14
2N2270
2.8
15.5
3.4
R87
1200
T
C78
0.28UF
B18
T20
R88
4700
C87
68UF
L33
500
C86
4.7UF
R85
470
C147
39UF
C85
47UF
9.0
8.5
6.2
R86
390
Q13
2N3638A
R84
2200
R82
1K
R83
1200
B20
R80
1000
Q12
2N3638A
13.5
13.0
1.9
R79
4700
C84
33UF
R81
1800
C83
1UF
R78
56K
R47
1500
Q15
2N1711
2.1
2.7
2.0
R46
220
C156
47UF
RT3
330
R96
8250
C60
330UF
Q16
2N1711
2.7
1.6
1.0
R43
1K
R145
2200
C75
2.2UF
R68
3300
Q19
2N1711
0.8
0.1
C76
3.3UF
R65
3300
0.8

51Y-4A ADF Receiver, Collins Part Number 522-2587-013, Schematic Diagram (Sheet 4 of 4)
Figure 814B


S1P FRONT
S1P REAR
S1I REAR
S1I FRONT
P/O S1J FRONT
S1J REAR
T107
T108
T109
T10
T11
T12
C90 18
C91 18
C92 18
C23 1.98-1240
C24 1.98-1240
C25 1.98-1240
C93 15
C94 18
C95 10
C26 1.98-1240
C27 1.98-1240
C28 1.98-1240
C96 8200
C152 0.01UF
C154 4.7
C183 15
R105 6800
R183 383
R137 6800
R182 383
C1D
C1C
C1E
B14
B5
B7
B8
C88 150UF
CR11 1N1775A
R131 1K
C113 10UF
C114 10UF
C34 360
C36 1.98-1240
C35 15
L3
C37 7
C39 360
C38 430
C40 1.98-1240
C41 5
L4
C44 1.98-1240
C42 1000
C45 5
L5
C31 27
OSC
Q6
2N2905A
C32 1500
R20 27K
R19 2200
R18 10K
R127 1K
C124 1UF
C10 0.01UF
L14 5MH
L13 5MH
L12 5MH
L15 5MH
R157 68
33
35
34
22
15
RF SENSITIVITY (CW)
RF SENSITIVIY (CCW)
RF SENSITIVIY (ARM)
TUNING METER
BFO ON/OFF
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20


MIXER
Q5
2N3638A
IST IF
Q7
2N3638A
2ND IF
Q8
2N3638A
3RD IF
Q9
2N3638A
4TH IF
Q10
2N3638A
5TH IF
Q11
2N3638A
T13
T14
T15
T16
T17
Z1
CR1
IN270
R36
56K
C57
0.1UF
C56
1500
R38
27K
CR2
IN270
R37
56K
R39
5600
L22
IMH
C157
360
C127
0.01UF
C110
.01UF
R90
250
R24
15K
R22
15K
B19
R15
10K
R21
39K
R16
22K
R126
1K
C115
1UF
C33
2.2UF
3
RT1
10K
C61
2.2UF
C46
10UF
C29
510
R17
12K
R23
2200
R106
8200
C47
.01UF
C48
0.01UF
R26
10K
R27
15K
R146
1K
C158
1UF
R25
100
C49
1UF
R166
1K
R28
2200
R107
8200
C50
.01UF
R100
120
C51
.01UF
R108
27K
R109
5600
R110
1500
C109
.01UF
C66
1UF
R102
2200
R118
1500
RT5
10K
C108
.01UF
R29
12K
R30
2200
R167
1K
R31
1K
C52
0.1UF
C107
1UF
R103
220
R104
220
C55
1UF
C53
.01UF
R32
15K
R33
12K
R34
560
R35
1500
C54
.01UF
C58
0.1UF
R41
42.2K
CR3
IN270
R42
5620
CR10
IN270
R40
2700
C117
0.1UF
R169
120K
B9
CR5
IN270
R116
120K
C59
0.1UF
RF GAIN
AUDIO AMPL
Q14
2N2270
R89
12
R87
1200
R88
4700
C86
4.7UF
C78
0.28UF
B18
T20
C87
68UF
L33
500
AUDIO AMPL
R85
470
C147
39UF
C85
47UF
Q13
2N3638A
R84
2200
R82
1K
R86
390
R83
1200
AUDIO AMPL
B20
R80
1000
Q12
2N3638A
R79
4700
C84
33UF
R81
1800
C83
1UF
R78
56K
AGC AMPL
R47
1500
Q15
2N1711
R46
220
C156
47UF
C60
330UF
RT3
330
R96
8250
AGC AMPL
Q16
2N1711
R43
1K
R145
2200
C75
2.2UF
SYNCHRONOUS FILTER
R68
3300
Q19
2N1711
C76
33UF
SYNCHRONOUS FILTER
R65
3300
Q20
2N1711
C77
33UF
C125
1.5UF
R66
4700
C79
2.2UF
LOOP SERVO AMPLIFIERS
Q17
2N3638A
R67
22K
R69
10K
R129
2700
C141
150UF
R130
4700
C80
10UF
R70
3900
C140
4.7UF
R71
8200
R72
4700
Q18
2N3638A
R73
680
C81
150UF
C62
120
C65
510
L11
10MH
Y1
142.5KC
C89
22
Q21
2N3638A
C63
1UF
R48
10K
C128
1UF
R45
8200
R44
8200
C64
510
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
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19
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NOTES:

① UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS

② BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:

BAND 2, ANT.
BAND 3, ANT.
BLANK
BAND 1, ADF
BAND 2, ADF
BAND 3, ADF
BLANK
BAND 1, LOOP
BAND 2, LOOP
BAND 3, LOOP
BLANK
BAND 1, ANT.

③ ALL POINTS ARE GROUNDED AT C1.

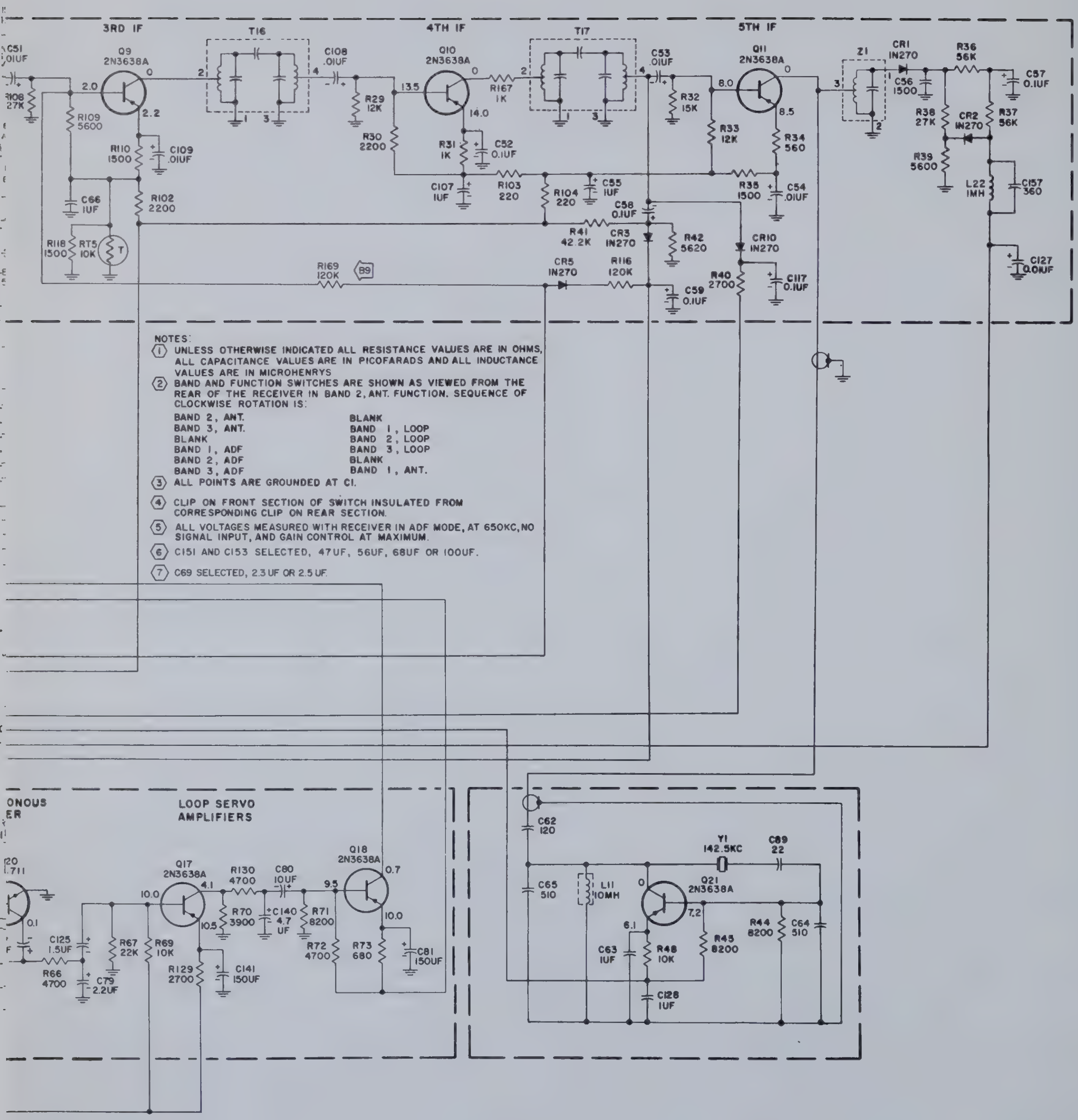
④ CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.

⑤ ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.

⑥ C151 AND C153 SELECTED, 47UF, 56UF, 68UF OR 100UF.

⑦ C69 SELECTED, 2.3 UF OR 2.5 UF.

51Y-4A ADF Receiver, Collins Part Number 522-2587-013, Schematic Diagram (Sheet 4 of 4)
Figure 814B


3RD IF
4TH IF
5TH IF
C51 .01UF
Q9 2N3638A
T16
C108 .01UF
Q10 2N3638A
T17
C53 .01UF
Q11 2N3638A
Z1
CR1 IN270
R36 56K
C57 0.1UF
R108 27K
R109 5600
R110 1500
C109 .01UF
R102 2200
C66 1UF
R118 1500
RT5 10K
T
R29 12K
R30 2200
R167 1K
R31 1K
C52 0.1UF
C107 1UF
R103 220
R104 220
C55 1UF
R32 15K
R33 12K
R34 560
R35 1500
C54 .01UF
C56 1500
R38 27K
CR2 IN270
R37 56K
R39 5600
L22 1MH
C157 360
C58 0.1UF
R41 42.2K
CR3 IN270
R42 5620
CR10 IN270
C117 0.1UF
R40 2700
C127 0.01UF
R169 120K
89
CR5 IN270
R116 120K
C59 0.1UF
2.0
2.2
13.5
14.0
8.0
8.5
ONOUS
ER
LOOP SERVO AMPLIFIERS
Q17 2N3638A
R130 4700
C80 10UF
Q18 2N3638A
0.7
10.0
4.1
10.5
9.5
R70 3900
C140 4.7 UF
R71 8200
R72 4700
R73 680
C81 150UF
0.1
C125 1.5UF
R66 4700
C79 2.2UF
R67 22K
R69 10K
R129 2700
C141 150UF
C62 120
Y1 142.5KC
C89 22
C65 510
L11 10MH
Q21 2N3638A
6.1
7.2
R45 8200
R44 8200
C64 510
C63 1UF
R48 10K
C128 1UF

NOTES:

① UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN PICOFARADS AND ALL INDUCTANCE VALUES ARE IN MICROHENRYS

② BAND AND FUNCTION SWITCHES ARE SHOWN AS VIEWED FROM THE REAR OF THE RECEIVER IN BAND 2, ANT. FUNCTION. SEQUENCE OF CLOCKWISE ROTATION IS:

BAND 2, ANT.	BLANK
BAND 3, ANT.	BAND 1, LOOP
BLANK	BAND 2, LOOP
BAND 1, ADF	BAND 3, LOOP
BAND 2, ADF	BLANK
BAND 3, ADF	BAND 1, ANT.

③ ALL POINTS ARE GROUNDED AT C1.

④ CLIP ON FRONT SECTION OF SWITCH INSULATED FROM CORRESPONDING CLIP ON REAR SECTION.

⑤ ALL VOLTAGES MEASURED WITH RECEIVER IN ADF MODE, AT 650KC, NO SIGNAL INPUT, AND GAIN CONTROL AT MAXIMUM.

⑥ C151 AND C153 SELECTED, 47UF, 56UF, 68UF OR 100UF.

⑦ C69 SELECTED, 2.3 UF OR 2.5 UF.

51Y-4/4A ADF Receiver - Storage Instructions

1. GENERAL.

Included in this section are storage instructions for the 51Y-4/4A ADF Receiver. Ensure that all subassemblies are secured to the chassis, and the 51Y-4/4A is installed in the dust cover. If the 51Y-4/4A is to be stored for a prolonged period, place the 51Y-4/4A in the original shipping carton.

51Y-4/4A ADF Receiver - Special Tools, Fixtures, and Test Equipment

1. GENERAL.

Included in this section is a list of special tools, fixtures, and test equipment required for test or overhaul of the 51Y-4/4A ADF Receiver.

2. TEST EQUIPMENT REQUIRED.

Figure 1001 lists the equipment required to test, troubleshoot, and overhaul the 51Y-4/4A. Any substitution of test equipment must be equivalent to, or better than that which is listed.

EQUIPMENT	MANUFACTURER AND PART NUMBER
477U-2 ADF Antenna Simulator	Collins part number 522-2710-00
and	
477V-2 ADF Test Set	Collins part number 522-2711-00
or	
477U-3 ADF Test Set only	Collins part number 522-4458-001
50-ohm test probe	See figure 801 in the troubleshooting section of this manual.
Signal generator (2 required)	Hewlett-Packard, Model 606A.
Ac/dc vtvm	Hewlett-Packard, Model 410B.
Ac vtvm	Ballantine Laboratories, Model 310
477U-2 Low Capacitance Sense Antenna Adapter for use with 51Y-4A ADF Receiver	Collins part number 544-6109-004
Oscilloscope	Hewlett-Packard, model 122A
Power output meter	Daven Co., Model OP961

Table of Test Equipment Required (Sheet 1 of 2)
Figure 1001

EQUIPMENT	MANUFACTURER AND PART NUMBER
Frequency counter	Hewlett-Packard, Model 5532A or 524C/525A
Audio oscillator	Hewlett-Packard, Model 200CD
Transistor tester	Hickok 870
Multimeter	Simpson 260
Stopwatch	Meylan 202A
Headset	Superex 17B6309
Balance fixture	Local Fabrication (see figure 513)

Table of Test Equipment Required (Sheet 2 of 2)
Figure 1001

51Y-4/4A ADF Receiver - Illustrated Parts List

INTRODUCTION

1. GENERAL.

This Illustrated Parts List is a complete list of parts for the above equipment manufactured by Collins Radio Company (see figure 1101).

Collins Radio Company part numbering system is comprised of a three-digit family number, a four-digit serial number, and two- or three-digit dash number:

FAMILY NO.	SERIAL NO.	DASH NO.
XXX	XXXX	XX or XXX

If a part is purchased by Collins Radio Compnay from a vendor, the Federal Manufacturer's Code Number is listed in the nomenclature column. If this column does not include a Federal Manufacturer's Code Number, the item is either a MIL approved item, commercial item or manufactured by Collins. Where COML appears in this column, the part may be obtained commercially from various vendors. Part numbers appearing in this column are Collins assigned part numbers for that item. Serial numbers or MCN (manufacturing control number) effectivities, where applicable, are listed in this column. Serial number effectivities are designated on the nameplate. The MCN is stamped on each module and/or chassis. Changes made from service bulletins are so indicated by SB1, SB2, etc.

2. MANUFACTURER'S CODE AND NAME INDEX.

CODE	MANUFACTURER'S NAME AND ADDRESS
	Scott, Inc. 2525 Curtiss St. Donner's Grove, IL 60515
00853	Sangamo Electric Co. S. Carolina Div. Pickens, SC 29671
01121	Allen - Bradley Co. 1201 S. 2nd St. Milwaukee, WI 53204
13499	Collins Radio Co. 5225 C Ave., N.E. Cedar Rapids, IA 52406
01526	General Electric Co. Specialty Control Dept. P.O. Box 812 Waynesboro, VA 22980
01939	Sprague Electric Co. of Wisconsin Grafton, WI 53024
03998	Control Data Corp. Cedar Engineering Div. 5806 W. 36th St. Minneapolis, MN 55416

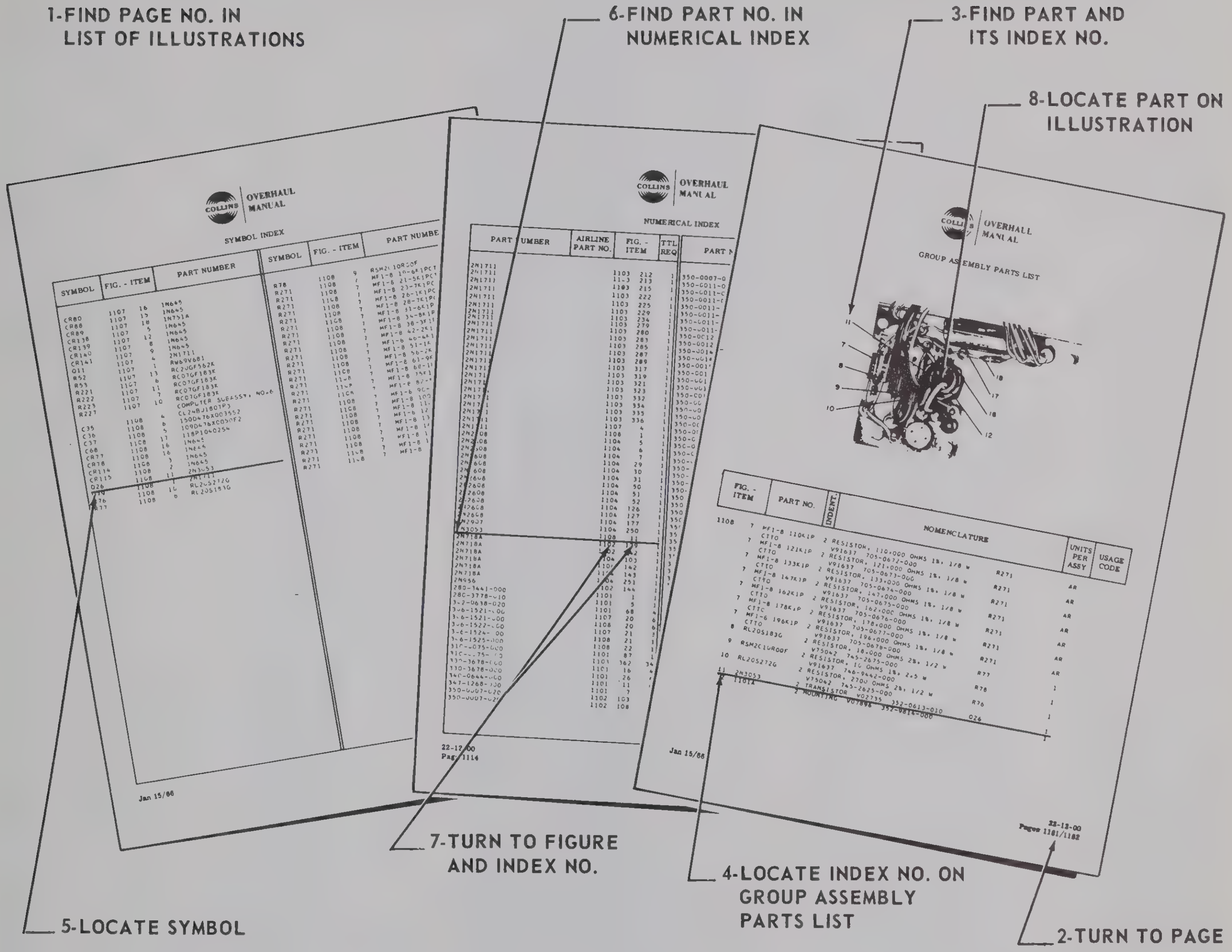
CODE	MANUFACTURER'S NAME AND ADDRESS
04713	Motorola Semiconductor Products Inc. 5005 East McDowell Rd. Phoenix, AZ 85008
06978	Aladdin Electronics Div. of Aladdin Industries, Inc. 705 Murfreesboro Rd. Nashville, TN 37210
10583	Industrical Mica Corp. Englewood, NJ 07631
10646	Carborundum Co., The P.O. Box 337 Niagara Falls, NY 14302
11402	Hisonic, Inc. 249 N. Troost Olathe, KS 66061
12014	Chicago Rivet and Machine Co. 950 S. 25th Ave. Bellwood, IL 60104
12204	Chrysler Corp. 341 Massachusetts Ave. Detroit, MI 48231
12615	U.S. Terminals, Inc. 7504 Camargo Rd. Cincinnati, OH 45243
13103	Thermalloy Co. 8717 Diplomacy Row Dallas, TX 75247
21242	American Electronic Components Corp. 7516 Camargo Rd. Cincinnati, OH 45243
25140	Globe Industries Div. of TRW, Inc. 2275 Stanley Ave. Dayton, OH 45404
40920	MPB Corp. Precision Park Keene, NH 03431
56289	Sprague Electric Co. Marshall St. North Adams, MA 01247
61864	United - Carr, Inc. Suite 4600 Prudential Center Boston, MA 02199
70417	Chrysler Corp. Amplex Div. 6501 Harper Ave. Detroit, MI 48211
70674	ADC Products Div. of Magnetic Controls Co. 6405 Cambridge St. Minneapolis, MN 55426
71279	Cambridge Thermionic Corp. 445 Concord Ave. Cambridge, MA 02138
71450	CTS Corp. 1142 W. Beardsley Ave. Elkhart, IN 46514
71468	ITT Cannon Electric, Inc. 3208 Humbolt St. Los Angeles, CA 90031
71785	Cinch Mfg. Co. and Howard B. Jones Div. 1026 S. Homan Ave. Chicago, IL 60624
72136	Electro Motive Mfg. Co., Inc., The South Park and John Streets Willimantic, CT 06226
72568	GM Laboratories, Inc. 4300 N. Knox Ave. Chicago, IL 60641

CODE	MANUFACTURER'S NAME AND ADDRESS
72962	Elastic Stop Nut Corp. of America 2330 Vauxhall Rd. Union, NJ 07083
72982	Erie Technological Products, Inc. 644 W. 12th St. Erie, PA 16512
74970	Johnson, E. F. Co. 297 Tenth Ave. S.W. Waseca, MN 56093
75237	Kaynar Mfg. Co. P.O. Box 3001 Fullerton, CA 92634
75378	CTS Knights, Inc. 101 E. Church St. Sandwich, IL 60548
76854	Oak Mfg. Co. Div. of Oak Electro/Netics Corp. S. Main Crystal Lake, IL 60014
77045	Sunbeam Electronics Div. John Oster Mfg. Co. 1400 Commercial Blvd. P.O. Box 23040 Fort Lauderdale, FL 33307
77147	Patton MacGuyer Co. Edgewood Station Providence, RI 02905
77250	Pheoll Manufacturing Co. Div. of Allied Products Corp. 5700 W. Roosevelt Rd. Chicago, IL 60650
77630	TRW Electronic Components Div. Davis and Copewood Streets Camden, NJ 08103
77820	Bendix Corp., The Electrical Components Div. Sherman Ave. Sidney, NY 13838
78189	Illinois Tool Works, Inc. Shakeproof Div. St. Charles Rd. Elgin, IL 60126
78488	Stackpole Carbon Co. St. Marys, PA 15857
79963	Zierick Mfg. Corp. 83 Rockdale Ave. New Rochelle, NY 10802
80294	Bourns, Inc. 1200 Columbia Ave. Riverside, CA 92507
81815	Communication Coil Co. 2839 N. Narragansett Ave. Chicago, IL 60634
82068	Burnell - Nytronics Third Ave. Alpha, NJ 08865
82142	Jeffers Electronics Div. of Speer Carbon Co. DuBois, PA 15801
86197	Litton Precision Products, Inc. Clifton Precision Products Div. Maple at Broadway Clifton Heights, PA 19018
88818	Kearfott Group Kearfott Products Div. General Precision Systems, Inc. 1150 McBride Ave. Little Falls, NJ 07424
91662	Elco Corp. Maryland Rd and Computer Ave Willow Grove, PA 19090
91663	Armel Electronics, Inc. 1601 75th St. North Bergen, NJ 07047

CODE	MANUFACTURER'S NAME AND ADDRESS	CODE	MANUFACTURER'S NAME AND ADDRESS
93108	Duralith Corp. 1025 Race Philadelphia, PA 19107		
97315	Ballastran Corp. 1701 N. Calhoun St. Fort Wayne, IN 46808		
98291	Sealectro Corp. 225 Hoyt Mamaroneck, NY 10544		
99378	Atlee Corp. 2 Lowell Ave. Winchester, MA 01890		
99800	Delevan Electronics Corp. 270 Quaker Rd. East Aurora, NY 14052		
99934	Renbrandt, Inc. 6 Parmelee St. Boston, MA 02118		

INTRODUCTION

How to Use This Illustrated Parts List


1-FIND PAGE NO. IN LIST OF ILLUSTRATIONS
6-FIND PART NO. IN NUMERICAL INDEX
3-FIND PART AND ITS INDEX NO.
8-LOCATE PART ON ILLUSTRATION
7-TURN TO FIGURE AND INDEX NO.
4-LOCATE INDEX NO. ON GROUP ASSEMBLY PARTS LIST
5-LOCATE SYMBOL
2-TURN TO PAGE

HOW TO FIND THE PART NUMBER IF THE SECTION OR SYSTEM OF THE EQUIPMENT IN WHICH THE PART IS USED IS KNOWN:

(1) Turn to the List of Illustrations and find the page number for the Major Assembly or System in which the part is used.

(2) Turn to the page determined in step (1).

(3) Locate the part and its index number on the illustration.

(4) Find the index number on the Group Assembly Parts List page to determine complete description.

(5) If the reference designation symbol is known, refer to the Symbol Index to find the part number.

HOW TO FIND THE ILLUSTRATION FOR A PART IF THE PART NUMBER IS KNOWN:

(6) Refer to the Numerical Index and find the part number.

(7) Turn to the Group Assembly Parts List and find the first figure and index number indicated in the Numerical Index for that part. If this figure shows the part in a section or system of the equipment other than the one desired, refer to the other figure numbers listed in the Numerical Index.

(8) On the face of the illustration, find the index number determined in step (7).

NUMERICAL INDEX

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
A12591	1104- 76	1	
A12598	1104- 75	1	
A12599	1101- 55	1	
A16634	1104- 78	1	
A16634	1104- 78	1	
A16634	1104- 78	1	
A201-5W	1111- 6	1	
BC23129	1103- 6	1	
BC23130	1105- 1	1	
BC3178	1104- 78	1	
BC3178	1104- 78	1	
CC20CH050C	1108- 11	1	
CC20CH050C	1108- 11	1	
CC20CH050D	1106- 9B	1	
CC20CH050D	1106- 11A	1	
CC20CH050D	1106- 18	1	
CC20CH050D	1106- 18	1	
CC20CH050D	1106- 18A	1	
CC20CH070D	1110- 10	1	
CC20CH070D	1110- 10	1	
CC20CH100D	1109- 12	1	
CC20CH100D	1109- 17	1	
CC20CH100D	1109- 17	1	
CC20CH100D	1110- 10	1	
CC20CH100D	1110- 10	1	
CC20CH120K	1108- 11A	1	
CC20CH150G	1108- 7	1	
CC20CH150G	1108- 7	1	
CC20CH150G	1109- 12	1	
CC20CH150G	1109- 12	1	
CC20CH150G	1109- 17	1	
CC20CH150G	1109- 17	1	
CC20CH150J	1109- 12	1	
CC20CH150J	1109- 12	1	
CC20CH150J	1109- 12	1	
CC20CH150J	1109- 17	1	
CC20CH150J	1109- 17	1	
CC20CH150J	1109- 17	1	
CC20CH180J	1108- 7	1	
CC20CH180J	1108- 8	1	
CC20CH180J	1108- 8	1	
CC20CH180J	1109- 2	1	
CC20CH180J	1109- 7	1	
CC20CH180J	1109- 10	1	
CC20CH180J	1109- 16	1	
CC20CK020D	1110- 17	1	
CC20CK020D	1110- 17	1	
CC20UJ030P	1106- 9B	1	
CC20UJ030P	1106- 11A	1	
CC20UJ030P	1106- 18A	1	
CC20UJ100C	1110- 8	1	
CC20UJ100C	1110- 8	1	
CC20UJ240G	1106- 10	1	
CC20UJ240G	1106- 12	1	
CC20UJ240G	1106- 18	1	
CC30UJ131G	1110- 17	1	
CC30UJ131G	1110- 17	1	
CC32CG510J	1110- 13	1	
CC32CG510J	1110- 13	1	
CC32SH121G	1110- 12	1	
CC32SH121G	1110- 12	1	
CC32UJ361F	1110- 12	1	
CC32UJ361F	1110- 12	1	
CC32UJ361F	1110- 12	1	
CC35UJ391F	1110- 16	1	
CC35UJ391F	1110- 16	1	
CL23CJ1R5TN3	1104- 35	1	
CL24BE201UP3	1101- 21	1	
CL24BE201UP3	1101- 21	1	
CL24BE600UP3	1104- 19	1	
CL24BE600UP3	1104- 19	1	
CL26BE400UN3	1104- 22	1	
CL26BE400UN3	1104- 22	1	
CL26BJ2R5TN3	1104- 35	1	
CL26BJ2R5TN3	1104- 42	AR	
CM04ED270J03	1101- 6N	1	
CM04FD271J03	1101- 6A	1	
CM05C120K03	1106- 12A	1	
CM05C180K03	1107- 21A	1	
CM05D361G03	1104- 34B	1	
CM05D361G03	1104- 34B	1	
CM05D361G03	1104- 44A	1	
CM05D361G03	1104- 44A	1	
CM05D331K03	1104- 44A	1	
CM05D220J03	1102- 4	1	
CM05D270J03	1110- 4	1	
CM05D470J03	1107- 21D	1	
CM05D820J03	1107- 21D	1	
CM05D101J03	1107- 21C	1	
CM05D101J03	1110- 15	1	
CM05D101J03	1110- 15	1	
CM05D121J03	1102- 7	1	
CM05D151J03	1110- 15	1	
CM05D151J03	1110- 15	1	
CM05D271J03	1106- 11	1	
CM05D271J03	1107- 6A	1	
CM05D271J03	1110- 16	1	
CM05D271J03	1110- 16	1	
CM05D361J03	1105- 71A	1	
CM05D361J03	1105- 71A	1	
CM05D361J03	1105- 71A	1	
CM05D361J03	1110- 16	1	
CM05D361J03	1110- 16	1	
CM05D361J03	1110- 16	1	
CM05D391J03	1107- 13A	1	
CM05D391J03	1110- 16	1	
CM05D391J03	1110- 16	1	
CM06D102G03	1110- 6	1	
CM06D102G03	1110- 6	1	
CM06D102G03	1110- 6	1	
CM06D202J03	1101- 58A	1	
CM06D302F03	1101- 58A	1	
CM06D302J03	1101- 58A	1	
CM06D302F03	1106- 25	1	
CM06D392J03	1107- 21D	1	
CM06D392J03	1107- 21D	1	
CM06D392J03	1109- 1	1	
CM06D392J03	1109- 1	1	
CM06D561J03	1107- 3	1	
CM06D561J03	1107- 3	1	
CM06D681J03	1107- 1A	1	
CM06ED431F03	1110- 13	1	
CM06FD152J03	1107- 1A	1	
CM06FD431F03	1110- 13	1	

NUMERICAL INDEX

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
CM07D203J03	1104- 67	1	
CM07D203J03	1104- 67	1	
CM19D431F03	1110- 13	1	
CM19D431F03	1110- 13	1	
CM19D621F03	1110- 6	1	
CR37AU100-000KC	1101- 6P	1	
CS13BD566K	1104- 77A	AR	
CS13BD566K	1104- 77B	AR	
CS13BF105M	1102- 6	1	
CS13BF105M	1102- 10	1	
CS13BF105M	1103- 9	1	
CS13BF105M	1103- 9	1	
CS13BF105M	1104- 8	1	
CS13BF105M	1104- 30	1	
CS13BF105M	1104- 32	1	
CS13BF105M	1104- 51	1	
CS13BF105M	1105- 20	1	
CS13BF105M	1105- 46	1	
CS13BF105M	1105- 56	1	
CS13BF105M	1105- 57A	1	
CS13BF105M	1105- 57A	1	
CS13BF105M	1105- 57A	1	
CS13BF105M	1105- 57A	1	
CS13BF105M	1105- 64	1	
CS13BF105M	1105- 65	1	
CS13BF105M	1106- 4	1	
CS13BF105M	1107- 9	1	
CS13BF105M	1107- 17	1	
CS13BF105M	1103- 9	1	
CS13BF105M	1105- 14	1	
DM15F511J300WV4CR	1102- 5	1	
DM15F511J300WV4CR	1102- 11	1	
DM15F511J300W4CR	1105- 4	1	
DM15F511J300W4CR	1105- 4	1	
DM15F511J300W4CR	1105- 13	1	
DM15F511K0	1101- 6T	1	
DM155C120K0	1107- 1A	1	
DM155C120K0	1107- 6A	1	
DM15F511J300W4CR	1109- 15	1	
DM19F561F03	1110- 7	1	
DM19F561F03	1110- 7	1	
DM19F621F03	1110- 6	1	
DM20F152J500WV	1105- 72	1	
DM20F152J500WV	1110- 5	1	
DM20F822J100WV	1109- 11	1	
DPXB45-34P0201	1101- 68	1	
D153F561K0	1104- 34B	1	
D153F561K0	1104- 34B	1	
D153F561K0	1104- 34B	1	
D153F751K0	1101- 6S	1	
D155F331K0	1104- 34B	1	
EB51G5	1104- 41	1	
EB51G5	1104- 41	1	
EB51G5	1104- 44	1	
EB51G5	1104- 44	1	
EGH11G4A521	1111-162	1	
EGH11G4A521	1111-162	1	
ETH11E4	1111-145	1	
EWC15A5A196	1111- 52	1	
EWC15A5A196	1111- 52	1	
F22NCFMA1-40	1104- 82	4	
F22NCFMA1-40	1105- 77	3	
F22NCFMA1-40	1106- 34	3	
F22NCFMA1-40	1107- 28	3	
F22NCFMA1-40	1108- 20	3	
F22NCFMA1-40	1109- 32	5	
F22NCFMA1-40	1110- 27	3	
F22NM107-62	1101- 3	2	
F22NM107-62	1101- 3	2	
F22NM107-62	1101- 3	2	
F358MILL6085A	1111- 71	1	
GA1-0MMFD201	1101- 6W	1	
GA1-5MMFD201	1101- 6W	1	
GA7-7UUFP0RM5PCT	1106- 43	1	
GA7-7UUFP0RM5PCT	1106- 43	1	
GA7-7UUFP0RM5PCT	1106- 43	1	
GA7-7UUFP0RM5PCT	1106- 44	1	
GA7-7UUFP0RM5PCT	1106- 44	1	
GA7-7UUFP0RM5PCT	1106- 44	1	
G1473	1104- 39	1	
G2513	1104- 38	1	
G2522	1102- 18	1	
G2522	1103- 44A	1	
G2522	1103- 44A	1	
G2522	1103- 44A	1	
G2522	1103- 45	14	
G2522	1104- 85	14	
G2522	1105- 79	17	
G2522	1106- 36	1	
G2522	1106- 39	1	
G2522	1106- 40	8	
G2522	1106- 41	3	
G2522	1107- 30	1	
G2522	1108- 22	1	
G2522	1109- 34	7	
G2522	1110- 29	1	
G2619	1103- 42	6	
G2619	1103- 42	6	
G2619	1103- 42	6	
G2619	1104- 84	10	
G2619	1104- 84A	2	
G2619	1104- 84A	2	
G2619	1104- 84A	2	
G2619	1106- 38	3	
G2619	1106- 39	1	
G2619	1108- 21	6	
G2619	1109- 33	5	
G2619	1110- 28	8	
G2621	1102- 17	7	
G2621	1103- 44	5	
G2621	1103- 44A	1	
G2621	1103- 44A	1	
G2621	1103- 44B	1	
G2621	1104- 83	22	
G2621	1104- 83A	1	
G2621	1104- 83A	1	
G2621	1104- 83A	1	
G2621	1104- 83B	1	
G2621	1104- 83B	1	
G2621	1104- 83B	1	
G2621	1105- 78	10	
G2621	1106- 35	2	
G2621	1106- 36	1	
G2621	1106- 37	1	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
G2621	1107- 29	13	
IMC140	1101- 18A	2	
IMC140	1104- 74A	10	
IMC140	1104- 74A	10	
IMC140	1104- 74A	10	
K1913-06	1101- 10	1	
LT4K041	1106- 8	1	
LT4K043	1109- 8	1	
LT4K043	1109- 8	1	
LT4K044	1106- 27	1	
LT4K046	1101- 5C	1	
LT4K046	1109- 8	1	
LT4K046	1109- 8	1	
LT4K046	1109- 8	1	
LT4K048	1106- 25	1	
LT7K203	1101- 34	1	
MPF054-31	1102- 3	1	
MPF054-31	1102- 3	1	
MPF054-31	1102- 3	1	
MS16632-1012	1101- 3	2	
MS16632-1012	1101- 3	2	
MS20426AD4-6	1101- 14A	4	
MS20426AD4-6	1101- 15	2	
MS35338-134	1101- 6R	1	
MS35338-134	1106- 1	2	
MS35338-134	1107- 1	2	
MS35338-134	1107- 25	1	
MS35338-134	1111-147	3	
MS35338-134	1111-151	3	
MS35338-134	1111-155	2	
MS35338-134	1111-155	2	
MS35338-134	1111-155A	2	
MS35338-134	1111-155A	2	
MS35338-134	1111-155A	2	
MS35338-134	1111-159	2	
MS35338-134	1111-164	3	
MS35338-135	1101- 6	4	
MS35338-135	1101- 6F	2	
MS35338-135	1101- 7	4	
MS35338-135	1101- 17	3	
MS35338-135	1101- 49	1	
MS35338-135	1101- 54	1	
MS35338-135	1101- 55	2	
MS35338-135	1101- 60	1	
MS35338-135	1101- 61	1	
MS35338-135	1101- 62	1	
MS35338-135	1101- 63	1	
MS35338-135	1101- 64	1	
MS35338-135	1102- 1	2	
MS35338-135	1103- 40	4	
MS35338-135	1104- 75	2	
MS35338-135	1104- 76	2	
MS35338-135	1104- 78	4	
MS35338-135	1104- 78	4	
MS35338-135	1104- 78	4	
MS35338-135	1104- 79	6	
MS35338-135	1105- 66	2	
MS35338-135	1105- 67	2	
MS35338-135	1105- 68	2	
MS35338-135	1105- 69	2	
MS35338-135	1105- 70	2	
MS35338-135	1105- 71	2	
MS35338-135	1105- 74	1	
MS35338-135	1111- 54	3	
MS35338-135	1111-141	2	
MS35338-136	1101- 65	2	
MS35338-136	1111- 3	2	
MS35338-136	1111- 21	1	
MS35338-136	1111- 28	3	
MS35338-136	1111- 38	1	
MS35338-136	1111- 45	3	
MS35338-136	1111- 50	1	
MS35338-136	1111- 58	4	
MS35338-138	1101- 18A	1	
MS35338-138	1101- 18A	1	
MS35649-24	1101- 6R	1	
MS35649-24	1106- 1	2	
MS35649-24	1107- 1	2	
MS35649-24	1107- 25	1	
MS51053-112	1111- 74	2	
MS51053-112	1111- 80	2	
MS51053-112	1111- 86	2	
MS51053-426	1111- 8	4	
MS51957-12	1101- 17	3	
MS51957-12	1101- 54	1	
MS51957-12	1101- 55	2	
MS51957-12	1101- 61	1	
MS51957-12	1101- 63	1	
MS51957-12	1104- 75	2	
MS51957-12	1104- 76	1	
MS51957-12	1104- 78	3	
MS51957-12	1104- 78	3	
MS51957-12	1104- 79	4	
MS51957-13	1101- 6	3	
MS51957-13	1101- 6	1	
MS51957-13	1101- 6F	2	
MS51957-13	1101- 7	4	
MS51957-13	1101- 36	5	
MS51957-13	1101- 37	4	
MS51957-13	1101- 48	7	
MS51957-13	1101- 60	4	
MS51957-13	1101- 61	3	
MS51957-13	1101- 61	1	
MS51957-13	1101- 62	4	
MS51957-13	1101- 63	5	
MS51957-13	1101- 63	1	
MS51957-13	1101- 64	4	
MS51957-13	1103- 40	4	
MS51957-13	1104- 76	1	
MS51957-13	1104- 78	3	
MS51957-13	1104- 78	3	
MS51957-13	1104- 78	3	
MS51957-13	1104- 79	4	
MS51957-13	1105- 74	1	
MS51957-13	1111- 53	3	
MS51957-13	1111- 53	3	
MS51957-13	1111- 53	3	
MS51957-15	1101- 6	1	
MS51957-15	1101- 68	4	
MS51957-15	1111-140	2	
MS51957-17	1111- 53	3	
MS51957-17	1111- 53	3	
MS51957-18	1101- 6	3	
MS51957-20	1102- 1	2	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
MS51957-26	1101- 65	1	
MS51957-26	1101- 67	4	
MS51957-26	1111- 2	2	
MS51957-27	1101- 1	1	
MS51957-28	1111- 27	1	
MS51957-28	1111- 44	1	
MS51957-28	1111- 57	4	
MS51957-29	1101- 9	2	
MS51957-3	1107- 25	1	
MS51957-30	1111- 26	2	
MS51957-30	1111- 43	2	
MS51957-34	1111- 49	1	
MS51957-4	1111-154	2	
MS51957-4	1111-154	2	
MS51957-5	1106- 1	2	
MS51957-5	1107- 1	2	
MS51957-5	1111-146	3	
MS51957-5	1111-150	3	
MS51957-5	1111-158	2	
MS51957-5	1111-163	3	
MS51959-13	1101- 49	1	
MS51959-13	1101- 51	1	
MS51959-13	1101- 52	1	
MS51959-13	1101- 53	1	
MS51959-27	1101- 37	4	
MS90538-01	1106- 28	1	
MS90538-09	1106- 26	1	
MS90538-17	1106- 27	1	
MS90539-08	1101- 20A	1	
MS90539-08	1101- 20A	1	
MS90539-08	1101- 20A	1	
MS90539-08	1107- 3	1	
MS90539-08	1107- 24	1	
MS90539-08	1107- 24	1	
MS90539-15	1105- 73	1	
MS90539-15	1107- 3	1	
MS90539-15	1107- 3	1	
MS90539-15	1107- 24	1	
MS90539-15	1107- 24	1	
MS90540-07	1104- 29	1	
MS90540-07	1107- 2	1	
MS90540-07	1107- 2	1	
MS90540-07	1107- 3	1	
MS90541-04	1104- 46	1	
MS90541-04	1104- 47	1	
MS90541-04	1104- 48	1	
MS90541-04	1104- 59	1	
MS90541-11	1107- 2	1	
M426	1101- 6R	1	
0004-7202S	1102- 15	1	
0004-7202S	1103- 43	8	
0004-7202S	1104- 81	3	
0004-7202S	1105- 76	5	
0004-7202S	1106- 33A	2	
0004-7202S	1109- 31	1	
05-3307-01	1102- 15	1	
05-3307-01	1105- 76	5	
05-3307-01	1106- 33	1	
05-3307-01	1106- 33A	1	
05-3307-01	1106- 33A	1	
05-3307-01	1109- 31	1	
05-3307-51	1103- 43	8	

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
05-3307-51	1104- 81	3	
05-3307-51	1106- 33A	1	
05-3307-51	1106- 33A	1	
05-3307-51	1106- 33A	1	
PT02A10-6P	1101- 6	1	
PT02A12-10P	1101- 7	1	
P313-0050-000	1101- 18A	1	
P313-0056-000	1104- 77	1	
P313-0056-000	1101- 18A	1	
P313-0056-000	1104- 1	1	
P313-0056-000	1104- 74A	5	
P313-0056-000	1104- 74A	5	
P313-0056-000	1104- 74A	5	
P313-0132-000	1101- 6	1	
P313-0132-000	1101- 6F	2	
P313-0132-000	1101- 51	1	
P313-0132-000	1101- 52	1	
P313-0132-000	1101- 53	1	
P313-0132-000	1101- 54	1	
P313-0132-000	1101- 68	4	
P313-0132-000	1103- 40	4	
P313-0132-000	1104- 78	4	
P313-0132-000	1104- 78	4	
P313-0132-000	1104- 78	4	
P313-0132-000	1104- 79	6	
P313-0132-000	1105- 66	1	
P313-0132-000	1105- 67	2	
P313-0132-000	1105- 68	2	
P313-0132-000	1105- 69	2	
P313-0132-000	1105- 70	2	
P313-0132-000	1105- 71	2	
P313-0132-000	1105- 74	1	
P313-0132-000	1106- 17	2	
P313-0132-000	1107- 22	2	
P313-0132-000	1108- 9	2	
P313-0132-000	1110- 9	2	
P313-0166-000	1106- 20	2	
P313-0166-000	1106- 23	4	
P313-0166-000	1109- 25	2	
P313-0166-000	1108- 13	2	
P313-0166-000	1108- 15	2	
P313-0166-000	1108- 17	2	
P313-0166-000	1109- 19	2	
P313-0166-000	1109- 21	2	
P313-0166-000	1109- 23	2	
P313-0166-000	1109- 27	2	
P313-0166-000	1109- 29	2	
P313-0166-000	1110- 20	2	
P313-0166-000	1110- 22	2	
P313-0166-000	1110- 24	2	
P313-0293-000	1109- 23	2	
P321-0293-000	1106- 20	2	
P321-0293-000	1106- 23	4	
P321-0293-000	1108- 13	2	
P321-0293-000	1108- 15	2	
P321-0293-000	1108- 17	2	
P321-0293-000	1109- 19	2	
P321-0293-000	1109- 21	2	
P321-0293-000	1109- 25	2	
P321-0293-000	1109- 27	2	
P321-0293-000	1109- 29	2	
P321-0293-000	1110- 20	2	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
P321-0293-000	1110- 22	2	
P321-0293-000	1110- 24	2	
P330-2285-000	1101- 10	2	
P334-0266-000	1103- 6	1	
P334-0266-000	1104- 38	1	
P334-0266-000	1104- 39	1	
P334-0266-000	1105- 1	1	
P343-0020-000	1101- 12	5	
P343-0021-000	1101- 8	2	
P343-0382-000	1102- 3	1	
P347-0005-000	1111- 4	2	
P347-0012-000	1110- 9	2	
P347-0013-000	1107- 22	2	
P347-0013-000	1111- 15	2	
P347-0014-000	1111- 10	2	
P347-0015-000	1108- 9	2	
P347-0015-000	1109- 14	2	
P347-0018-000	1101- 1A	1	
P347-0023-000	1111-154A	2	
P347-0023-000	1111-154A	2	
P347-0023-000	1111-154A	2	
P347-0045-000	1111- 20	1	
P347-0045-000	1111- 37	1	
P347-1269-000	1101- 1A	1	
RC07GF100K	1104- 15	1	
RC07GF100K	1104- 15	1	
RC07GF101K	1105- 57	1	
RC07GF101K	1105- 57	1	
RC07GF101K	1105- 57	1	
RC07GF101K	1106- 5B	1	
RC07GF101K	1107- 5B	1	
RC07GF102K	1103- 12	1	
RC07GF102K	1103- 12	1	
RC07GF102K	1103- 12	1	
RC07GF102K	1103- 23	1	
RC07GF102K	1103- 23	1	
RC07GF102K	1104- 21	1	
RC07GF102K	1104- 21	1	
RC07GF102K	1104- 21	1	
RC07GF102K	1104- 52	1	
RC07GF102K	1104- 56	1	
RC07GF102K	1105- 9A	1	
RC07GF102K	1105- 9A	1	
RC07GF102K	1105- 9A	1	
RC07GF102K	1105- 13A	1	
RC07GF102K	1105- 23A	1	
RC07GF102K	1105- 26	1	
RC07GF102K	1105- 26	1	
RC07GF102K	1105- 49	1	
RC07GF102K	1105- 62	1	
RC07GF102K	1105- 63	1	
RC07GF102K	1107- 10	1	
RC07GF102K	1107- 15	1	
RC07GF102K	1107- 15	1	
RC07GF102K	1108- 4	1	
RC07GF103K	1101- 6J	1	
RC07GF103K	1101- 6K	1	
RC07GF103K	1102- 9	1	
RC07GF103K	1103- 19	1	
RC07GF103K	1103- 19	1	
RC07GF103K	1103- 19	1	

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
RC07GF103K	1103- 19	1	
RC07GF103K	1103- 19	1	
RC07GF103K	1103- 34	1	
RC07GF103K	1103- 34	1	
RC07GF103K	1105- 10	1	
RC07GF103K	1105- 10	1	
RC07GF103K	1105- 10	1	
RC07GF103K	1106- 30	1	
RC07GF103K	1106- 30	1	
RC07GF103K	1107- 4	1	
RC07GF103K	1107- 4	1	
RC07GF103K	1107- 4A	1	
RC07GF103K	1107- 5	1	
RC07GF103K	1107- 15	1	
RC07GF103K	1107- 15	1	
RC07GF103K	1107- 15	1	
RC07GF103K	1107- 16	1	
RC07GF103K	1107- 16	1	
RC07GF103K	1107- 24A	1	
RC07GF103K	1107- 24A	1	
RC07GF103K	1108- 5	1	
RC07GF103K	1109- 4	1	
RC07GF103K	1109- 4	1	
RC07GF103K	1109- 6	1	
RC07GF103K	1109- 6	1	
RC07GF103K	1109- 6	1	
RC07GF103K	1110- 1	1	
RC07GF103K	1107- 5	1	
RC07GF104K	1101- 6U	1	
RC07GF121K	1101- 57	1	
RC07GF121K	1101- 57	1	
RC07GF121K	1105- 55	1	
RC07GF121K	1105- 55	1	
RC07GF121K	1105- 55	1	
RC07GF122K	1101- 20	1	
RC07GF122K	1101- 20	1	
RC07GF122K	1101- 20	1	
RC07GF122K	1103- 5	1	
RC07GF122K	1103- 12	1	
RC07GF122K	1103- 12	1	
RC07GF122K	1103- 12	1	
RC07GF123K	1104- 9	1	
RC07GF123K	1104- 50	1	
RC07GF123K	1105- 10	1	
RC07GF123K	1105- 10	1	
RC07GF123K	1105- 21	1	
RC07GF123K	1105- 21	1	
RC07GF123K	1105- 21	1	
RC07GF123K	1105- 27	1	
RC07GF123K	1106- 2	1	
RC07GF123K	1106- 2	1	
RC07GF123K	1106- 2	1	
RC07GF123K	1106- 30	1	
RC07GF123K	1109- 9	1	
RC07GF124K	1105- 18A	1	
RC07GF124K	1105- 18A	1	
RC07GF124K	1105- 52	1	
RC07GF150K	1104- 12	1	
RC07GF150K	1104- 12	1	
RC07GF150K	1104- 12	1	
RC07GF150K	1104- 15	1	
RC07GF150K	1104- 15	1	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
RC07GF150K	1104- 15	1	
RC07GF150K	1104- 36	1	
RC07GF150K	1104- 36	1	
RC07GF150K	1104- 36	1	
RC07GF150K	1104- 41	1	
RC07GF150K	1104- 41	1	
RC07GF150K	1104- 41	1	
RC07GF150K	1104- 44	1	
RC07GF150K	1104- 44	1	
RC07GF150K	1104- 44	1	
RC07GF151K	1104- 49	1	
RC07GF151K	1104- 55	1	
RC07GF152K	1103- 14	1	
RC07GF152K	1104- 33	1	
RC07GF152K	1104- 33	1	
RC07GF152K	1104- 33	1	
RC07GF152K	1104- 56A	AR	
RC07GF152K	1105- 17	1	
RC07GF152K	1105- 25	1	
RC07GF152K	1105- 60	1	
RC07GF152K	1105- 60	1	
RC07GF152K	1105- 60	1	
RC07GF152K	1106- 3	1	
RC07GF152K	1107- 12	1	
RC07GF153K	1105- 3	1	
RC07GF153K	1105- 3	1	
RC07GF153K	1105- 3	1	
RC07GF153K	1105- 7	1	
RC07GF153K	1105- 9	1	
RC07GF153K	1105- 28	1	
RC07GF153K	1105- 60	1	
RC07GF153K	1105- 60	1	
RC07GF153K	1107- 2A	1	
RC07GF153K	1107- 4A	1	
RC07GF182K	1103- 8	1	
RC07GF182K	1104- 56A	AR	
RC07GF182K	1107- 7B	1	
RC07GF182K	1107- 21	1	
RC07GF182K	1108- 2	1	
RC07GF184K	1109- 5	1	
RC07GF184K	1109- 5	1	
RC07GF221K	1103- 15	1	
RC07GF221K	1104- 12A	1	
RC07GF221K	1104- 12A	1	
RC07GF221K	1104- 15A	1	
RC07GF221K	1104- 64	1	
RC07GF221K	1105- 43	1	
RC07GF221K	1105- 47	1	
RC07GF221K	1105- 57	1	
RC07GF221K	1105- 57	1	
RC07GF221K	1106- 2A	1	
RC07GF221K	1106- 3A	1	
RC07GF221K	1106- 29	1	
RC07GF221K	1107- 8	1	
RC07GF221K	1107- 8	1	
RC07GF221K	1107- 8	1	
RC07GF221K	1107- 10	1	
RC07GF221K	1107- 10	1	
RC07GF222K	1103- 2	1	
RC07GF222K	1103- 2B	1	
RC07GF222K	1103- 2B	1	
RC07GF222K	1103- 2B	1	

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
RC07GF222K	1103- 18	1	
RC07GF222K	1103- 18	1	
RC07GF222K	1104- 4	1	
RC07GF222K	1104- 14A	1	
RC07GF222K	1104- 14A	1	
RC07GF222K	1104- 53	1	
RC07GF222K	1104- 56A	AR	
RC07GF222K	1105- 2	1	
RC07GF222K	1105- 8	1	
RC07GF222K	1105- 48	1	
RC07GF222K	1105- 51	1	
RC07GF222K	1105- 51	1	
RC07GF222K	1105- 51	1	
RC07GF222K	1107- 10	1	
RC07GF222K	1110- 3	1	
RC07GF223K	1103- 26A	1	
RC07GF223K	1103- 26A	1	
RC07GF223K	1103- 26A	1	
RC07GF223K	1105- 21	1	
RC07GF223K	1105- 21	1	
RC07GF223K	1106- 2	1	
RC07GF223K	1106- 2	1	
RC07GF223K	1109- 5	1	
RC07GF223K	1109- 5	1	
RC07GF223K	1109- 5	1	
RC07GF272K	1103- 20	1	
RC07GF272K	1103- 20	1	
RC07GF272K	1103- 20	1	
RC07GF272K	1104- 56A	AR	
RC07GF272K	1104- 63	1	
RC07GF272K	1105- 40	1	
RC07GF272K	1105- 40	1	
RC07GF272K	1105- 40	1	
RC07GF272K	1107- 8	1	
RC07GF272K	1107- 8	1	
RC07GF272K	1107- 24A	1	
RC07GF272K	1108- 2	1	
RC07GF273K	1105- 15	1	
RC07GF273K	1105- 36	1	
RC07GF273K	1110- 2	1	
RC07GF331K	1104- 43	1	
RC07GF331K	1104- 43	1	
RC07GF331K	1104- 43	1	
RC07GF331K	1105- 55	1	
RC07GF331K	1105- 55	1	
RC07GF332K	1103- 27	1	
RC07GF332K	1103- 29	1	
RC07GF332K	1104- 56A	AR	
RC07GF332K	1105- 40	1	
RC07GF332K	1105- 40	1	
RC07GF332K	1107- 4A	1	
RC07GF332K	1107- 7C	1	
RC07GF391K	1103- 1	1	
RC07GF391K	1104- 54	1	
RC07GF391K	1107- 6	1	
RC07GF391K	1107- 6	1	
RC07GF392K	1101- 5D	1	
RC07GF392K	1103- 11	1	
RC07GF392K	1103- 11	1	
RC07GF392K	1103- 21	1	
RC07GF392K	1103- 21	1	
RC07GF392K	1103- 21	1	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
RC07GF392K	1103- 32	1	
RC07GF392K	1103- 32	1	
RC07GF392K	1104- 56A	AR	
RC07GF392K	1106- 9	1	
RC07GF392K	1107- 6	1	
RC07GF392K	1107- 7	1	
RC07GF392K	1107- 21B	1	
RC07GF393K	1109- 4	1	
RC07GF393K	1109- 4	1	
RC07GF393K	1109- 4	1	
RC07GF393K	1109- 6	1	
RC07GF393K	1109- 6	1	
RC07GF471K	1103- 3	1	
RC07GF471K	1104- 10	1	
RC07GF471K	1107- 2A	1	
RC07GF472K	1101- 57	1	
RC07GF472K	1101- 57	1	
RC07GF472K	1101- 57	1	
RC07GF472K	1103- 11	1	
RC07GF472K	1103- 11	1	
RC07GF472K	1103- 11	1	
RC07GF472K	1103- 18	1	
RC07GF472K	1103- 18	1	
RC07GF472K	1103- 18	1	
RC07GF472K	1103- 23	1	
RC07GF472K	1103- 23	1	
RC07GF472K	1103- 23	1	
RC07GF472K	1103- 25	1	
RC07GF472K	1105- 51	1	
RC07GF472K	1105- 51	1	
RC07GF472K	1106- 9	1	
RC07GF472K	1106- 27	1	
RC07GF472K	1107- 7C	1	
RC07GF472K	1107- 10	1	
RC07GF472K	1108- 1	1	
RC07GF561K	1103- 12	1	
RC07GF561K	1103- 12	1	
RC07GF561K	1104- 32A	1	
RC07GF561K	1104- 32A	1	
RC07GF561K	1104- 34	1	
RC07GF561K	1105- 26	1	
RC07GF561K	1105- 26	1	
RC07GF561K	1105- 26	1	
RC07GF562K	1104- 40	1	
RC07GF562K	1104- 40	1	
RC07GF562K	1104- 68	1	
RC07GF562K	1104- 68	1	
RC07GF562K	1104- 68	1	
RC07GF562K	1105- 16	1	
RC07GF562K	1105- 34	1	
RC07GF562K	1107- 7A	1	
RC07GF563K	1103- 10	1	
RC07GF563K	1105- 38	1	
RC07GF563K	1105- 39	1	
RC07GF563K	1107- 16	1	
RC07GF563K	1107- 16A	1	
RC07GF563K	1107- 16A	1	
RC07GF563K	1107- 21A	1	
RC07GF680K	1104- 24	1	
RC07GF680K	1104- 24	1	
RC07GF680K	1104- 24	1	
RC07GF680K	1104- 43	1	
RC07GF680K	1104- 43	1	
RC07GF680K	1104- 45	1	
RC07GF680K	1106- 9A	1	
RC07GF680K	1106- 9A	1	
RC07GF681K	1103- 12	1	
RC07GF681K	1103- 12	1	
RC07GF681K	1103- 26	1	
RC07GF681K	1103- 33	1	
RC07GF681K	1103- 33	1	
RC07GF681K	1104- 21	1	
RC07GF681K	1104- 21	1	
RC07GF681K	1107- 3A	1	
RC07GF682K	1101- 6C	1	
RC07GF682K	1104- 34A	1	
RC07GF682K	1104- 34A	1	
RC07GF682K	1106- 6	1	
RC07GF682K	1106- 7	1	
RC07GF682K	1106- 7A	1	
RC07GF682K	1106- 7B	1	
RC07GF683K	1103- 20	1	
RC07GF683K	1103- 20	1	
RC07GF821K	1103- 12	1	
RC07GF821K	1103- 12	1	
RC07GF821K	1104- 33	1	
RC07GF821K	1104- 33	1	
RC07GF822K	1101- 6L	1	
RC07GF822K	1101- 6Q	1	
RC07GF822K	1101- 6V	1	
RC07GF822K	1102- 2	1	
RC07GF822K	1102- 8	1	
RC07GF822K	1103- 31	1	
RC07GF822K	1104- 31	1	
RC07GF822K	1105- 6	1	
RC07GF822K	1105- 12	1	
RC20GF150K	1104- 12	1	
RC20GF150K	1104- 12	1	
RC20GF150K	1104- 36	1	
RC20GF150K	1104- 36	1	
RC20GF220K	1104- 58	1	
RC20GF222K	1104- 68	1	
RC20GF222K	1104- 68	1	
RC20GF271K	1104- 24	1	
RC20GF271K	1104- 24	1	
RC20GF330K	1104- 43	1	
RC20GF330K	1104- 43	1	
RC20GF681K	1101- 20	1	
RC20GF681K	1101- 20	1	
RC32GF120K	1101- 56	1	
RC32GF122K	1104- 25	1	
RC32GF122K	1104- 25	1	
RC32GF331K	1104- 25	1	
RN55D8251F	1103- 13	1	
RN55D8251F	1103- 13	1	
RN55D8251F	1103- 13	1	
RN60D1001F	1103- 16	1	
RN60D1002F	1103- 13	1	
RN60D1002F	1103- 13	1	
RN60D18R2F	1104- 27	1	
RN60D18R2F	1104- 27	1	
RN60D3160F	1107- 7	1	
RN60D3160F	1107- 7	1	
RN60D3830F	1106- 3A	1	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
RN60D3830F	1106- 3B	1	
RN60D4222F	1105- 44	1	
RN60D5621F	1105- 29	1	
RN65D18R7F	1104- 27	1	
RTMT12M	1101- 49	1	
RW69V161	1104- 20	1	
RW69V161	1104- 20	1	
RW69V181	1104- 25	1	
RW69V8R2	1104- 66	1	
R3484X1-8CADPL	1109- 35	2	
R4008X3-32CHROMATEDP	1102- 16	2	
SL441-434DWHT	1101- 6X	12	
SPL4040-2HOTTINNED	1111-144	5	
SPL4040-2HOTTINNED	1107- 25	2	
SPL4040-2HOTTINNED	1111-161	5	
SPL4040-2HOTTINNED	1111-161	1	
SPL4040-4HOTTINNED	1101- 6	1	
SPL4040-4HOTTINNED	1101- 48	1	
SPL4040-4HOTTINNED	1101- 49	1	
SPL4040-4HOTTINNED	1101- 54	1	
SPL4040-4HOTTINNED	1101- 55	1	
SPL4040-4HOTTINNED	1103- 40	7	
SPL4040-4HOTTINNED	1104- 75	1	
SPL4040-4HOTTINNED	1104- 76	2	
SPL4040-4HOTTINNED	1104- 79	15	
SPL4040-4HOTTINNED	1105- 67	1	
SPL4040-4HOTTINNED	1105- 68	2	
SPL4040-4HOTTINNED	1105- 69	1	
SPL4040-4HOTTINNED	1105- 70	1	
SPL4040-4HOTTINNED	1105- 71	1	
SPL4040-4HOTTINNED	1105- 74	3	
SPL4040-4HOTTINNED	1111- 51	7	
SPL4040-4HOTTINNED	1111- 51	1	
ST10009-4	1111-149	1	
S11014-4	1111-157	1	
S418FCHH3P15L02	1111- 67	1	
S418FCHH3P15L02	1111-130	1	
S518FCHH3P15L02	1111- 59	1	
S518FCHH3P15L02	1111- 60	1	
S518FCHH3P15L02	1111- 61	1	
S518FCHH3P15L02	1111- 62	1	
S518FCHH3P15L02	1111- 63	1	
S518FCHH3P15L02	1111- 64	1	
S518FCHH3P15L02	1111- 65	1	
S518FCHH3P15L02	1111- 66	1	
S518FCHH3P15L02	1111- 68	1	
S518FCHH3P15L02	1111- 69	1	
S518FCHH3P15L02	1111-128	1	
S518FCHH3P15L02	1111-129	1	
S518FCHH3P15L02	1111-131	1	
S518FCHH3P15L02	1111-132	1	
S518FCHH3P15L02	1111-133	1	
S518FCHH3P15L02	1111-134	1	
S518FCHH3P15L02	1111-135	1	
S518FCHH3P15L02	1111-136	1	
S518FCHH3P15L02	1111-137	1	
S518FCHH3P15L02	1111-138	1	
S88076	1102- 3	1	
S88076	1102- 3	1	
TGH11E4B080	1111-162A	1	
TGH11E4B080	1111-162A	1	
TGH11E4B080	1111-162A	1	

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
T1532	1101- 6H	1	
T957HOTTINNED	1101- 62	1	
T957HOTTINNED	1101- 68A	2	
X270-2	1110- 19	1	
X271-2	1110- 21	1	
X272-2	1110- 23	1	
X273-3	1108- 16	1	
X274-3	1108- 14	1	
X275-2	1108- 12	1	
X282-2	1109- 24	1	
X282-2	1109- 24	1	
X283-2	1109- 26	1	
X284-3	1109- 28	1	
X487-2	1105- 71	1	
X489-2	1105- 66	1	
X489-2	1105- 67	1	
X489-2	1105- 68	1	
X489-2	1105- 69	1	
X489-2	1105- 70	1	
X851-T10	1109- 22	1	
X851-T10	1109- 22	1	
X851-T10	1109- 24	1	
X851-T10	1109- 24	1	
X851-T10	1109- 24	1	
X852	1109- 20	1	
X852	1109- 20	1	
X853	1109- 18	1	
X853	1109- 18	1	
X854	1106- 24	1	
X855	1106- 19	1	
X855	1106- 21	1	
X891	1106- 19	1	
X892	1106- 21	1	
X893	1106- 24	1	
0004-7202S	1107- 27	1	
0004-7202S	1108- 19	1	
0004-7202S	1110- 26	1	
05-3307-001	1110- 26	1	
05-3307-01	1107- 27	1	
05-3307-01	1108- 19	1	
1N1116	1104- 65	1	
1N1775A	1104- 3	1	
1N270	1103- 23	1	
1N270	1103- 23	1	
1N270	1104- 6	1	
1N270	1104- 7	1	
1N270	1105- 35	1	
1N270	1105- 37	1	
1N270	1105- 42	1	
1N270	1105- 45	1	
1N270	1105- 54	1	
1N270	1107- 19	1	
1N270	1107- 20	1	
1N457	1103- 22	1	
1N457	1103- 22	1	
1N645	1104- 37	1	
1N645	1104- 37	1	
10FB1A	1111- 52A	1	
10FB1A	1111- 52A	1	
10FB1A	1111- 52A	1	
100-206-2	1101- 6P	1	
100-206-2	1102- 16	1	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
109D106X0050C2	1103- 28	1	
109D106X0050C2	1103- 30	1	
109D305X9075C2	1103- 28	1	
109D305X9075C2	1103- 28	1	
109D305X9075C2	1103- 30	1	
109D305X9075C2	1103- 30	1	
1101	1101- 18A	1	
1101	1101- 18A	1	
1101	1101- 18A	1	
1101	1104- 74A	5	
1101	1104- 74A	5	
1101	1104- 74A	5	
1101A	1101- 18A	1	
1101A	1101- 18A	1	
1101A	1104- 74A	5	
1101A	1104- 74A	5	
150D103X0035A2	1105- 4	1	
150D103X0035A2	1105- 4	1	
150D103X0035A2	1105- 13	1	
150D103X0035A2	1105- 13	1	
150D103X0035A2	1105- 22	1	
150D103X0035A2	1105- 22	1	
150D103X0035A2	1105- 23	1	
150D103X0035A2	1105- 23	1	
150D103X0035A2	1105- 32	1	
150D103X0035A2	1105- 32	1	
150D103X0035A2	1110- 14	1	
150D103X0035A2	1110- 14	1	
150D104X0035A2	1103- 9	1	
150D104X0035A2	1103- 9	1	
150D104X0035A2	1104- 13	1	
150D104X0035A2	1104- 13	1	
150D104X0035A2	1105- 18	1	
150D104X0035A2	1105- 18	1	
150D104X0035A2	1105- 22	1	
150D104X0035A2	1105- 22	1	
150D104X0035A2	1105- 23	1	
150D104X0035A2	1105- 23	1	
150D104X0035A2	1105- 23	1	
150D104X0035A2	1105- 30	1	
150D104X0035A2	1105- 31	1	
150D104X0035A2	1105- 31	1	
150D104X0035A2	1105- 33	1	
150D104X0035A2	1105- 41	1	
150D104X0035A2	1105- 50	1	
150D104X0035A2	1106- 5	1	
150D104X0035A2	1106- 5	1	
150D104X0035A2	1106- 8	1	
150D105X0035A2	1101- 6D	1	
150D105X0035A2	1103- 9	1	
150D105X0035A2	1103- 9	1	
150D105X0035A2	1104- 61	1	
150D105X0035A2	1104- 61	1	
150D105X0035A2	1105- 19	1	
150D105X0035A2	1105- 19	1	
150D105X0035A2	1105- 23	1	
150D105X0035A2	1105- 23	1	
150D105X0035A2	1105- 24	1	
150D105X0035A2	1105- 24	1	
150D105X0035A2	1105- 58	1	
150D105X0035A2	1105- 58	1	
150D105X0035A2	1107- 4A	1	

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
150D105X0035A2	1107- 17	1	
150D106X0020B2	1101- 21	1	
150D106X0020B2	1101- 21	1	
150D106X0020B2	1103- 21	1	
150D106X0020B2	1103- 21	1	
150D106X0020B2	1103- 24	1	
150D106X0020B2	1103- 33A	1	
150D106X0020B2	1103- 33A	1	
150D106X0020B2	1104- 16	1	
150D106X0020B2	1104- 17	1	
150D106X0020B2	1105- 58	1	
150D106X0020B2	1105- 58	1	
150D106X0020B2	1105- 58	1	
150D106X0020B2	1107- 5A	1	
150D106X0020B2	1107- 5A	1	
150D107X0010R2	1103- 39	1	
150D107X0010R2	1103- 39	1	
150D107X0010R2	1104- 77A	AR	
150D107X0010R2	1104- 77B	AR	
150D155X0020A2	1103- 16A	1	
150D155X0020A2	1103- 16A	1	
150D155X0020A2	1103- 16A	1	
150D156X0020B2	1103- 33A	1	
150D156X0020B2	1103- 33A	1	
150D157X0015S2	1103- 35	1	
150D157X0015S2	1103- 35	1	
150D157X0015S2	1103- 35	1	
150D157X0015S2	1103- 39	1	
150D157X0015S2	1103- 39	1	
150D157X0015S2	1103- 39	1	
150D157X0015S2	1103- 39	1	
150D157X0015S2	1103- 39	1	
150D157X0015S2	1104- 23	1	
150D157X0015S2	1104- 23	1	
150D157X0015S2	1104- 23	1	
150D157X0015S2	1104- 23	1	
150D157X0015S2	1104- 23	1	
150D157X0015S2	1104- 11	1	
150D157X0015S2	1104- 11	1	
150D223X0035A2	1106- 31	1	
150D223X0035A2	1106- 31	1	
150D223X0035A2	1106- 31	1	
150D223X0035A2	1106- 31	1	
150D225X0020A2	1103- 17	1	
150D225X0020A2	1103- 33A	1	
150D225X0020A2	1103- 33A	1	
150D225X0020A2	1105- 5	1	
150D225X0020A2	1105- 5	1	
150D225X0020A2	1105- 11	1	
150D225X0020A2	1105- 11	1	
150D225X0020A2	1105- 59	1	
150D225X0020A2	1107- 9	1	
150D225X0020A2	1108- 3	1	
150D225X0020A2	1108- 6	1	
150D225X0020A2	1109- 3	1	
150D225X0035B2	1103- 21A	1	
150D225X0035B2	1103- 21A	1	
150D225X0035B2	1103- 21A	1	
150D226X0035R2	1104- 20	1	
150D226X0035R2	1104- 20	1	
150D227X0010S2	1103- 36	1	
150D227X0010S2	1103- 36	1	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
150D276X9020R2	1104- 20	1	
150D276X9020R2	1104- 20	1	
150D276X9020R2	1104- 20	1	
150D334X0035A2	1103- 7	1	
150D335X0015A2	1103- 28	1	
150D335X0015A2	1103- 28	1	
150D335X0015A2	1103- 28	1	
150D335X0015A2	1103- 30	1	
150D335X0015A2	1103- 30	1	
150D335X0015A2	1103- 30	1	
150D337X0006S2	1103- 36	1	
150D337X0006S2	1103- 36	1	
150D337X0006S2	1103- 36	1	
150D396X9010B2	1103- 2A	1	
150D396X9010B2	1103- 2A	1	
150D396X9010B2	1103- 2A	1	
150D474X0035A2	1104- 6A	1	
150D474X0035A2	1104- 6A	1	
150D475X0010A2	1101- 58	1	
150D475X0010A2	1103- 33A	1	
150D475X0010A2	1103- 33A	1	
150D475X0010A2	1103- 33A	1	
150D476X0006B2	1103- 14A	1	
150D476X0006B2	1103- 14A	1	
150D476X0006B2	1103- 14A	1	
150D476X0020R2	1103- 4	1	
150D476X0020R2	1104- 14	1	
150D476X0020R2	1104- 14	1	
150D476X0020R2	1104- 14	1	
150D476X0020R2	1104- 14	1	
150D476X0020R2	1104- 14	1	
150D476X0020R2	1104- 62	1	
150D476X0020R2	1104- 62	1	
150D476X0020R2	1104- 62	1	
150D476X0020R2	1104- 62	1	
150D476X0020R2	1104- 62	1	
150D476X0020R2	1104- 77A	AR	
150D476X0020R2	1104- 77B	AR	
150D476X0020R2	1104- 2	1	
150D476X0020R2	1104- 2	1	
150D476X0020R2	1104- 5	1	
150D476X0020R2	1104- 5	1	
150D476X0035S2	1104- 28	1	
150D476X0035S2	1104- 28	1	
150D686X0015R2	1104- 26	1	
150D686X0015R2	1104- 26	1	
150D686X0015R2	1104- 26	1	
150D686X0015R2	1104- 26	1	
150D686X0015R2	1104- 26	1	
150D686X0015R2	1104- 26	1	
150D686X0015R2	1104- 26	1	
150D686X0015R2	1104- 77A	AR	
150D686X0015R2	1104- 77B	AR	
150D686X0020S2	1101- 21	1	
150D686X0020S2	1101- 21	1	
150D686X0020S2	1101- 21	1	
150D686X0020S2	1104- 28	1	
150D686X0020S2	1104- 2	1	
151D113X0035W2	1106- 5	1	
151D113X0035W2	1106- 5	1	
151D114X0035W2	1104- 13	1	
151D114X0035W2	1104- 13	1	

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
151D115X0035X2	1104- 69	AR	
151D115X0035X2	1104- 69	AR	
151D164X0035W2	1104- 69	AR	
151D164X0035W2	1104- 69	AR	
151D164X0035W2	1104- 69	AR	
151D235X9050X2	1104- 42	AR	
151D284X9035W2	1101- 19	1	
151D284X9035W2	1101- 19	1	
151D284X9035W2	1101- 66	1	
151D284X9035W2	1101- 66	1	
151D344X0035W2	1104- 69	AR	
151D504X0035W2	1104- 69	AR	
151D754X0035X2	1104- 69	AR	
1537-48	1106- 3A	1	
1537-48	1106- 3B	1	
1594-3	1111- 23	5	
1594-3	1111- 40	5	
1810-00	1104- 1	1	
1810-00	1104- 65	1	
1810-00	1104- 77	1	
189-6-8	1106- 20	1	
189-6-8	1106- 22	1	
189-6-8	1106- 23	1	
189-6-8	1108- 13	1	
189-6-8	1108- 15	1	
189-6-8	1108- 17	1	
189-6-8	1109- 19	1	
189-6-8	1109- 21	2	
189-6-8	1109- 23	1	
189-6-8	1109- 25	1	
189-6-8	1109- 27	1	
189-6-8	1109- 29	1	
189-6-8	1110- 20	1	
189-6-8	1110- 22	1	
189-6-8	1110- 24	1	
1914-05-00-2480	1103- 6	1	
1914-05-00-2480	1104- 38	1	
1914-05-00-2480	1104- 39	1	
1914-05-00-2480	1105- 1	1	
192D10392	1110- 14	1	
192P10392	1105- 4	1	
192P10392	1105- 4	1	
192P10392	1105- 4	1	
192P10392	1105- 5	1	
192P10392	1105- 5	1	
192P10392	1105- 5	1	
192P10392	1105- 11	1	
192P10392	1105- 11	1	
192P10392	1105- 11	1	
192P10392	1105- 13	1	
192P10392	1105- 13	1	
192P10392	1105- 13	1	
192P10392	1105- 18	1	
192P10392	1105- 18	1	
192P10392	1105- 18	1	
192P10392	1105- 19	1	
192P10392	1105- 19	1	
192P10392	1105- 19	1	
192P10392	1105- 22	1	
192P10392	1105- 22	1	
192P10392	1105- 22	1	
192P10392	1105- 23	1	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
192P10392	1105- 23	1	
192P10392	1105- 24	1	
192P10392	1105- 24	1	
192P10392	1105- 24	1	
192P10392	1105- 31	1	
192P10392	1105- 31	1	
192P10392	1105- 31	1	
192P10392	1105- 32	1	
192P10392	1105- 32	1	
192P10392	1105- 32	1	
192P10392	1106- 5	1	
192P10392	1106- 5	1	
192P10392	1106- 5	1	
192P10392	1106- 8	1	
192P10392	1106- 31A	1	
192P10392	1106- 31A	1	
192P10392	1107- 6C	1	
192P10392	1107- 6C	1	
192P10392	1107- 9	1	
192P10392	1107- 13	1	
192P10392	1107- 13	1	
192P10392	1107- 13	1	
192P10392	1107- 14	1	
192P10392	1107- 14	1	
192P10392	1107- 14	1	
192P10392	1107- 18	1	
192P10392	1107- 18	1	
192P10392	1107- 18	1	
192P10392	1107- 24A	1	
192P10392	1107- 24A	1	
192P10392	1109- 1	1	
192P10392	1109- 1	1	
192P10392	1109- 1	1	
192P10392	1110- 14	1	
192P10392	1110- 14	1	
192P10492	1104- 13	1	
192P10492	1104- 13	1	
192P10492	1104- 13	1	
2N1131	1104- 74	1	
2N1131	1104- 74	1	
2N1131	1104- 74	1	
2N1285	1101- 22	1	
2N1285	1101- 22	1	
2N1285	1101- 38	1	
2N1285	1101- 38	1	
2N1285	1101- 39	1	
2N1285	1101- 39	1	
2N1285	1101- 40	1	
2N1285	1101- 40	1	
2N1285	1101- 41	1	
2N1285	1101- 41	1	
2N1285	1101- 42	1	
2N1285	1101- 42	1	
2N1285	1101- 43	1	
2N1285	1101- 43	1	
2N1285	1101- 43A	1	
2N1285	1101- 43A	1	
2N1285	1101- 44	1	
2N1285	1101- 44	1	
2N1285	1101- 45	1	
2N1285	1101- 45	1	
2N1285	1101- 46	1	
2N1285	1101- 46	1	
2N1285	1101- 47	1	
2N1285	1101- 47	1	
2N158A	1101- 18	1	
2N158A	1101- 18	1	
2N158A	1104- 70	1	
2N158A	1104- 70	1	
2N158A	1104- 71	1	
2N158A	1104- 71	1	
2N158A	1104- 72	1	
2N158A	1104- 72	1	
2N158A	1104- 73	1	
2N158A	1104- 73	1	
2N158A	1104- 74	1	
2N158A	1104- 74	1	
2N1711	1101- 6G	1	
2N1711	1101- 25	1	
2N1711	1101- 25	1	
2N1711	1101- 25	1	
2N1711	1101- 26	1	
2N1711	1101- 26	1	
2N1711	1101- 26	1	
2N1711	1101- 29	1	
2N1711	1101- 29	1	
2N1711	1101- 29	1	
2N1711	1101- 30	1	
2N1711	1101- 30	1	
2N1711	1101- 30	1	
2N174	1104- 1	1	
2N174	1104- 77	1	
2N2270	1101- 18	1	
2N2270	1101- 18	1	
2N2270	1101- 18	1	
2N2405	1101- 33	1	
2N2405	1101- 33	1	
2N2405	1101- 33	1	
2N2405	1104- 70	1	
2N2405	1104- 70	1	
2N2405	1104- 70	1	
2N2405	1104- 71	1	
2N2405	1104- 71	1	
2N2405	1104- 71	1	
2N2405	1104- 72	1	
2N2405	1104- 72	1	
2N2405	1104- 72	1	
2N2405	1104- 73	1	
2N2405	1104- 73	1	
2N2405	1104- 73	1	
2N2905A	1101- 47	1	
2N2905A	1101- 47	1	
2N2905A	1101- 47	1	
2N2905A	1101- 47	1	
2N2905A	1101- 47	1	
2N2905A	1101- 47	1	
2N333	1101- 25	1	
2N333	1101- 25	1	
2N333	1101- 26	1	
2N333	1101- 26	1	
2N333	1101- 29	1	
2N333	1101- 29	1	
2N333	1101- 30	1	
2N333	1101- 30	1	

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2N341	1101- 33	1	
2N341	1101- 33	1	
2N3638A	1101- 6M	1	
2N3638A	1101- 22	1	
2N3638A	1101- 22	1	
2N3638A	1101- 22	1	
2N3638A	1101- 23	1	
2N3638A	1101- 23	1	
2N3638A	1101- 23	1	
2N3638A	1101- 24	1	
2N3638A	1101- 24	1	
2N3638A	1101- 24	1	
2N3638A	1101- 27	1	
2N3638A	1101- 27	1	
2N3638A	1101- 27	1	
2N3638A	1101- 28	1	
2N3638A	1101- 28	1	
2N3638A	1101- 28	1	
2N3638A	1101- 31	1	
2N3638A	1101- 31	1	
2N3638A	1101- 31	1	
2N3638A	1101- 32	1	
2N3638A	1101- 32	1	
2N3638A	1101- 32	1	
2N3638A	1101- 38	1	
2N3638A	1101- 38	1	
2N3638A	1101- 38	1	
2N3638A	1101- 39	1	
2N3638A	1101- 39	1	
2N3638A	1101- 39	1	
2N3638A	1101- 40	1	
2N3638A	1101- 40	1	
2N3638A	1101- 40	1	
2N3638A	1101- 41	1	
2N3638A	1101- 41	1	
2N3638A	1101- 41	1	
2N3638A	1101- 42	1	
2N3638A	1101- 42	1	
2N3638A	1101- 42	1	
2N3638A	1101- 43	1	
2N3638A	1101- 43	1	
2N3638A	1101- 43	1	
2N3638A	1101- 43A	1	
2N3638A	1101- 43A	1	
2N3638A	1101- 43A	1	
2N3638A	1101- 44	1	
2N3638A	1101- 44	1	
2N3638A	1101- 44	1	
2N3638A	1101- 45	1	
2N3638A	1101- 45	1	
2N3638A	1101- 45	1	
2N3638A	1101- 46	1	
2N3638A	1101- 46	1	
2N3638A	1101- 46	1	
2N525	1101- 23	1	
2N525	1101- 23	1	
2N525	1101- 24	1	
2N525	1101- 24	1	
2N525	1101- 27	1	
2N525	1101- 27	1	
2N525	1101- 28	1	
2N525	1101- 28	1	
2N525	1101- 31	1	
2N525	1101- 31	1	
2N525	1101- 32	1	
2N525	1101- 32	1	
224L1-202	1106- 1	1	
224L1-502	1107- 1	1	
232067F	1106- 15	1	
232068F	1109- 14	1	
232666F	1106- 14	1	
232666F	1106- 15	1	
232667F	1106- 13	1	
235401F	1106- 16	1	
235402FC	1110- 9	1	
235431F	1106- 13	1	
235432F	1106- 14	1	
235433F	1107- 22	1	
235434F	1108- 9	1	
235436F	1108- 10	1	
235437F	1107- 22	1	
235437F	1107- 23	1	
235438F	1109- 13	1	
235796K	1111- 13	1	
235797K	1111- 9	1	
235798K	1111- 14	1	
237946F	1107- 22	1	
268451F	1107- 22	1	
268451F	1107- 23	1	
280-3778-010	1101- 2A	1	
289-2197-000	1102- 12	1	
3SBC1016A2	1101- 6F	1	
301-000P3K0-100D	1110- 8	1	
301-000P3K0-100D	1110- 8	1	
301-000P3K0-100D	1110- 8	1	
301-000P3K0-100D	1110- 11	1	
301-000P3K0-100D	1110- 11	1	
301-000R3A0-150J	1110- 17	1	
301-000R3A0-200J	1108- 8	1	
301-000R3A0-200J	1108- 8	1	
301-000R3A0-200J	1108- 8	1	
301-000R3A0-240J	1106- 10	1	
301-000R3A0-240J	1108- 7	1	
301-000R3A0-240J	1108- 7	1	
301-000R3A0-509C	1110- 10	1	
301-000R3A0-509C	1110- 10	1	
301-000R3K0-200J	1108- 8	1	
301-000R3K0-200J	1108- 8	1	
301N3300-85DEGC20PFPOR M25PCT	1108- 7	1	
301N3300-85DEGC20PFPOR M25PCT	1108- 7	AR	
301N3300-85DEGC20PFPOR M25PCT	1108- 7	1	
301N3300-85DEGC20PRPOR M25PCT	1108- 7	AR	
301N3300-85DEGC20PRPOR M25PCT	1108- 7	AR	
301N4200-85C15FPORM5P M25PCT	1108- 7	AR	
301N4200-85C15PFPORM5P M25PCT	1108- 7	AR	
301N4200-85C15PFPORM5P M25PCT	1108- 7	AR	

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301N4200-85DEGC5PFPORM-25PF	1110- 11	1	
301N4200-85DEGC5PFPORM-25PF	1108- 11	1	
301N4200-85DEGC5PFPORM-25PF	1108- 11	1	
301N4200-85DEGC5PFPORM-25PF	1108- 11	1	
301N4200-85DEGC5PFPORM-25PF	1110- 8	1	
301N4200-85DEGC5PFPORM-25PF	1110- 8	1	
301N4200-85DEGC5PFPORM-25PF	1110- 8	1	
301N4200-85DEGC5PFPORM-25PF	1110- 11	1	
302-0638-020	1101- 3	4	
302-0638-020	1101- 3	4	
309-0118-000	1111-167	1	
310-0044-000	1111-156A	2	
310-0044-000	1111-156A	2	
310-0044-000	1111-156A	2	
310-0046-000	1111- 22	1	
310-0046-000	1111- 29	2	
310-0046-000	1111- 39	1	
310-0046-000	1111- 46	2	
310-0059-000	1101- 18A	1	
310-0059-000	1104- 74A	5	
310-0059-000	1104- 74A	5	
310-0059-000	1104- 74A	5	
310-0060-000	1101- 18A	1	
310-0060-000	1101- 18A	1	
310-0060-000	1104- 1	1	
310-0060-000	1104- 65	1	
310-0060-000	1104- 74A	5	
310-0060-000	1104- 74A	5	
310-0060-000	1104- 77	1	
310-0278-000	1101- 51	1	
310-0278-000	1101- 52	1	
310-0278-000	1101- 53	1	
310-0278-000	1101- 68	4	
310-0278-000	1106- 17	2	
310-0278-000	1107- 22	2	
310-0278-000	1108- 9	2	
310-0278-000	1110- 9	2	
310-3340-000	1111- 5	2	
310-6340-000	1111- 53A	3	
310-6340-000	1111- 53A	3	
310-6340-000	1111- 53A	3	
313-0132-000	1109- 13	2	
324-1691-020	1101- 65	1	
33C2	1107- 18	1	
33C2	1107- 18	1	
33C41	1104- 57	1	
330-3677-000	1101- 1	2	
335-0022-000	1111- 31	2	
347-0315-000	1106- 17	2	
4M17Z5	1104- 60	1	
4007-4HOTTINNED	1101- 6B	2	
4021	1104- 1	1	
4021	1104- 65	1	
4021	1104- 77	1	

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
41A144	1111-153	1	
41A330	1111-153	1	
416H17	1105- 61	1	
416H17	1105- 61	1	
422-04-22-034-113	1101- 53	1	
4412-13-36	1101- 5B	1	
4422-11-117	1109- 1	1	
4422-11-117	1109- 1	1	
4422-9-36	1109- 1	1	
4422-9-36	1109- 1	1	
48186BRSBLKNIPL	1101- 11	1	
5C53	1101- 19	1	
502-1515-002	1111-142	2	
506-5906-003	1104- 76	2	
5133-25C	1111-104	1	
522-1836-00	1101- 0	1	
522-2587-00	1101- 0	1	
522-2587-013	1101- 0	1	
541-1243-003	1104- 74A	10	
541-1243-003	1104- 74A	10	
541-1244-003	1104- 1	1	
541-1244-003	1104- 77	1	
541-1245-003	1104- 74A	5	
541-1245-003	1104- 74A	5	
541-5178-002	1101- 8	2	
541-5966-002	1107- 22	4	
541-5966-002	1111- 17	2	
541-5968-002	1109- 13	2	
541-5968-002	1109- 14	2	
541-5968-002	1110- 9	2	
541-5968-002	1111- 18	2	
541-5970-002	1106- 17	8	
541-5970-002	1108- 9	4	
541-5977-002	1101- 6	3	
541-5995-002	1111- 12	2	
542-1348-002	1104- 74A	5	
542-1348-002	1104- 74A	5	
542-4160-002	1111-148	3	
542-4160-002	1111-160	2	
542-4160-002	1111-165	3	
542-4177-002	1111- 77	1	
542-4177-002	1111- 83	1	
542-4177-002	1111- 89	1	
542-5313-002	1104- 1	1	
542-5313-002	1104- 77	1	
542-6624-002	1111- 32	1	
544-3541-002	1111-152	3	
545-7529-002	1110- 24	2	
545-7529-003	1106- 20	2	
545-7529-003	1106- 23	4	
545-7529-003	1108- 13	2	
545-7529-003	1108- 15	2	
545-7529-003	1108- 17	2	
545-7529-003	1109- 19	2	
545-7529-003	1109- 21	2	
545-7529-003	1109- 23	2	
545-7529-003	1109- 25	2	
545-7529-003	1109- 27	2	
545-7529-003	1109- 29	2	
545-7529-003	1110- 20	2	
545-7529-003	1110- 22	2	
545-7533-003	1101- 1	1	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
546-8145-002	1111- 34	2	
548-3954-002	1101- 1	1	
548-7673-003	1106- 32	1	
548-7674-003	1101- 17	1	
548-7676-004	1106- 42	1	
548-7677-005	1101- 63	1	
548-7677-005	1109- 0	REF	
548-7678-005	1101- 60	1	
548-7678-005	1106- 0	REF	
548-7693-003	1101- 1A	1	
548-7694-003	1101- 2	1	
548-7764-004	1107- 0	REF	
548-7764-004	1101- 61	1	
548-9539-003	1101- 18A	1	
548-9539-003	1104- 74A	5	
548-9539-003	1104- 74A	5	
548-9539-003	1104- 74A	5	
548-9549-003	1104- 1	1	
548-9549-003	1104- 77	1	
548-9550-003	1104- 74A	5	
548-9550-003	1104- 74A	5	
549-3514-002	1101- 2	1	
549-3905-002	1101- 3	2	
549-3905-002	1101- 3	2	
549-3906-002	1101- 3	1	
549-3906-002	1101- 3	1	
549-3907-002	1101- 3	1	
549-3907-002	1101- 3	1	
549-3908-002	1101- 14	1	
549-3908-002	1101- 14	1	
549-3909-003	1101- 4	1	
549-3914-003	1101- 5	1	
549-3914-003	1101- 5	1	
549-3919-003	1101- 13	1	
549-3927-003	1101- 9	1	
549-3934-004	1101- 3	1	
549-3934-004	1101- 3	1	
549-4081-00	1101-	1	
549-4082-00	1101-	1	
549-4084-002	1111- 76	1	
549-4084-002	1111- 82	1	
549-4085-002	1111-120	1	
549-4086-002	1111-119	1	
549-4087-002	1111- 95	1	
549-4087-002	1111- 98	1	
549-4088-002	1111- 94	1	
549-4089-002	1111-126	1	
549-4090-002	1111-125	1	
549-4091-002	1111-117	1	
549-4092-002	1111-116	1	
549-4093-002	1111-111	1	
549-4093-002	1111-114	1	
549-4094-002	1111-110	1	
549-4095-002	1111-113	1	
549-4096-002	1111-108	1	
549-4097-002	1111-107	1	
549-4098-002	1111-105	1	
549-4099-002	1111-106	1	
549-4100-002	1111-103	1	
549-4101-002	1111-101	1	
549-4102-002	1111-100	1	
549-4103-002	1111- 97	1	

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
549-4104-002	1111- 92	1	
549-4105-002	1111- 91	1	
549-4106-002	1111- 88	1	
549-4107-002	1111- 75	1	
549-4107-002	1111- 81	1	
549-4107-002	1111- 87	1	
549-4108-002	1111-156	2	
549-4108-002	1111-156	2	
549-4109-002	1111- 55	3	
549-4109-002	1111- 55	3	
549-4110-002	1111-139	1	
549-4111-002	1111- 56	1	
549-4112-002	1111- 48	1	
549-4113-002	1111- 30	2	
549-4113-002	1111- 47	2	
549-4114-003	1111- 1	1	
549-4115-002	1102- 1	2	
549-4117-002	1101- 59	1	
549-4118-002	1111- 7	1	
549-4120-002	1111- 24	1	
549-4120-002	1111- 41	1	
549-4121-002	1111-143	2	
549-4122-002	1101- 52	1	
549-4122-002	1101- 60	1	
549-4122-002	1101- 61	1	
549-4122-002	1101- 62	1	
549-4122-002	1101- 63	1	
549-4122-002	1101- 64	1	
549-4123-003	1111- 73	1	
549-4123-003	1111- 79	1	
549-4124-002	1111- 85	1	
549-4125-002	1111-123	1	
549-4126-002	1111-122	1	
549-4127-002	1102- 1	2	
549-4128-003	1111- 78	1	
549-4128-003	1111- 84	1	
549-4129-003	1111-121	1	
549-4130-003	1111- 96	1	
549-4130-003	1111-124	1	
549-4131-003	1111-102	1	
549-4132-003	1111-112	1	
549-4132-003	1111-118	1	
549-4133-003	1111-115	1	
549-4134-003	1111-109	1	
549-4135-003	1111- 99	1	
549-4136-003	1111- 93	1	
549-4137-003	1111- 33	1	
549-4138-003	1111- 35	1	
549-4139-003	1111- 90	1	
549-4140-003	1111- 25	1	
549-4140-003	1111- 42	1	
549-4141-003	1101- 12	1	
549-4142-003	1102- 19	1	
549-4143-003	1102- 14	1	
549-4145-003	1110- 25	1	
549-4147-003	1108- 18	2	
549-4148-003	1107- 26	1	
549-4148-004	1107- 26	1	
549-4150-003	1101- 15	1	
549-4150-003	1101- 15	1	
549-4151-003	1111- 19	1	
549-4151-003	1111- 36	1	

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549-4152-003	1111-127	1	
549-4155-004	1111- 72	1	
549-4156-004	1111- 70	1	
549-4157-004	1111-168	1	
549-4158-004	1111-166	1	
549-4159-004	1101- 16	1	
549-4161-004	1110- 30	1	
549-4163-004	1109- 36	1	
549-4164-004	1109- 35	1	
549-4166-004	1108- 23	1	
549-4168-004	1107- 31	1	
549-4171-004	1101- 1	1	
549-4172-004	1101- 64	1	
549-4172-004	1110- 0	REF	
549-4174-004	1101- 62	1	
549-4174-004	1108- 0	REF	
549-4174-005	1101- 62	1	
549-4174-005	1108- 0	REF	
549-4175-004	1101- 61	1	
549-4175-004	1107- 0	REF	
549-4177-004	1101- 35	1	
549-4177-004	1102- 0	REF	
549-4180-004	1104- 80	1	
549-4182-005	1101- 69	1	
549-4183-005	1105- 80	1	
549-4184-005	1105- 75	1	
549-4185-005	1103- 46	1	
549-4186-005	1103- 41	1	
549-4187-005	1101- 67	1	
549-4187-005	1111- 0	REF	
549-4188-005	1101- 48	1	
549-4188-005	1105- 0	REF	
549-4188-006	1101- 48	1	
549-4188-006	1105- 0	REF	
549-4189-005	1101- 36	1	
549-4189-005	1101- 36	1	
549-4189-005	1103- 0	REF	
549-4189-005	1103- 0	REF	
549-4190-005	1101- 37	1	
549-4190-005	1104- 0	REF	
549-4193-005	1104- 86	1	
549-6602-002	1101- 50	1	
549-6603-002	1101- 51	1	
55C30	1104- 67	1	
55C30	1104- 67	1	
55C30	1104- 67	1	
55C32A2	1107- 13	1	
55C32A2	1107- 13	1	
55C32A2	1107- 14	1	
55C32A2	1107- 14	1	
553-2329-003	1101- 1A	1	
553-9420-003	1111- 78A	1	
553-9420-003	1111- 78A	1	
554-3948-001	1101- 3	1	
554-3948-001	1101- 3	1	
554-3948-001	1101- 3	1	
554-3955-001	1101- 15	1	
554-3955-001	1101- 15	1	
554-3955-001	1101- 15	1	
554-4706-004	1109- 30	1	
554-5564-003	1106- 32	1	
554-5565-004	1101- 17	1	
554-5566-005	1101- 60	1	
554-5566-005	1106- 0	REF	
600D157G015DD4	1103- 35	1	
600D157G015DD4	1103- 35	1	
600D157G015DD4	1103- 39	1	
600D157G015DD4	1103- 39	1	
600D157G015DD4	1104- 23	1	
600D157G015DD4	1104- 23	1	
600D157G015DD4	1104- 2	1	
600D157G015DD4	1104- 2	1	
600D157G015DD4	1104- 2	1	
600D157G015DD4	1104- 11	1	
600D157G015DD4	1104- 11	1	
600D157G015DD4	1104- 11	1	
600D227G007DD4	1103- 36	1	
600D227G007DD4	1103- 36	1	
600D405F200KD4	1104- 64A	1	
600D405F200KD4	1104- 64A	1	
600D405F200KD4	1104- 64A	1	
600D476G030KD4	1104- 14	1	
600D476G030KD4	1104- 14	1	
600D476G030KD4	1104- 62	1	
600D476G030KD4	1104- 62	1	
600D476G030KD4	1104- 2	1	
600D476G030KD4	1104- 2	1	
600D476G030KD4	1104- 5	1	
600D476G030KD4	1104- 5	1	
600D506G040DD4	1104- 28	1	
600D506G040DD4	1104- 28	1	
600D506G040DD4	1104- 28	1	
6229-70-02	1111-149	1	
65-136	1107- 6B	1	
A101	1107- 6B	1	
665-054-262A	1111-157	1	
665-55-84-1	1111-149	1	
68-1660-26	1101- 10	2	
7RS900-3A	1111-145	1	
761-0356-001	1101- 18A	1	
761-0356-001	1101- 18A	1	
761-0356-001	1104- 74A	5	
761-0356-001	1104- 74A	5	
761-5187-001	1101- 5A	2	
761-5187-001	1101- 5A	2	
761-5187-001	1101- 5A	2	
761-5188-001	1101- 5	1	
761-5188-001	1101- 5	1	
761-5188-001	1101- 5	1	
761-5189-001	1101- 14A	2	
761-5189-001	1101- 14A	2	
761-5189-001	1101- 14A	2	
761-5190-001	1101- 3	2	
761-5190-001	1101- 3	2	
761-5190-001	1101- 3	2	
763-2532-001	1111- 55A	3	
763-2532-001	1111- 55A	3	
763-2532-001	1111- 55A	3	
763-5762-001	1111- 78B	1	
763-5762-001	1111- 78B	1	
763-5762-001	1111- 78B	1	
763-8453-001	1101- 6Y	1	
763-8455-001	1101- 6E	1	
763F28	1105- 53	1	

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PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.
763F28	1105- 53	1	
763F28	1105- 53	1	
763F28	1105- 61	1	
763F28	1105- 61	1	
763F28	1105- 61	1	
763F89	1103- 37	1	
763F93	1107- 11	1	
763F93	1107- 11	1	
777-0372-001	1101- 36	1	
777-0372-001	1101- 36	1	
777-0372-001	1103- 0	REF	
777-0372-001	1103- 0	REF	
777-0901-001	1111- 55	3	
777-0901-001	1111- 55	3	
777-0901-001	1111- 55	3	
805-014X5V0103Z	1106- 5	1	
805-014X5V0103Z	1106- 5	1	
855-502X5V0203Z	1106- 31	1	
855-502X5V0203Z	1106- 31	1	
8942	1106- 17	2	
8942	1107- 22	2	
8942	1108- 9	2	
8942	1109- 13	6	
8942	1109- 14	4	
8942	1110- 9	4	
8942	1111- 11	6	
8942	1111- 16	2	
921-0020-00	1101- 65	1	
997F17	1103- 38	1	
997F17	1103- 38	1	
997F17	1105- 53	1	
997F17	1105- 53	1	

PART NUMBER	FIG. - ITEM	TTL REQ	AIRLINE PART NO.

SYMBOL INDEX

SYMBOL	FIG. - ITEM	PART NUMBER
B1	1111-145	ETH11E4
B1	1111-145	7RS900-3A
B2	1111-153	41A330
B2	1111-153	41A144
B3	1111- 52	EWC15A5A196
B3	1111- 52	EWC15A5A196
B3	1111- 52A	229-7027-030
B3	1111- 52A	229-7027-030
B3	1111- 52A	229-7027-030
B3	1111- 52A	10FB1A
B3	1111- 52A	10FB1A
B3	1111- 52A	10FB1A
B4	1111-162	EGH11G4A521
B4	1111-162	EGH11G4A521
B4	1111-162A	TGH11E4B080
B4	1111-162A	TGH11E4B080
B4	1111-162A	TGH11E4B080
B5	1111-157	665-054-262A
B5	1111-157	S11014-4
CR1	1105- 35	1N270
CR2	1105- 37	1N270
CR3	1105- 45	1N270
CR4	1104- 60	4M17Z5
CR5	1105- 54	1N270
CR6	1104- 6	1N270
CR7	1104- 65	1N1116
CR9	1104- 7	1N270
CR10	1105- 42	1N270
CR11	1104- 3	1N1775A
CR12	1103- 23	1N270
CR12	1103- 23	1N270
CR13	1103- 22	1N457
CR13	1103- 22	1N457
CR14	1104- 37	1N645
CR14	1104- 37	1N645
CR15	1107- 19	1N270
CR16	1107- 20	1N270
C1	1101- 65	921-0020-00
C2	1108- 17	189-6-8
C3	1108- 15	189-6-8
C4	1108- 13	189-6-8
C5	1108- 6	150D225X0020A2
C6	1108- 3	150D225X0020A2
C7	1110- 15	CM05D151J03
C7	1110- 15	CM05D101J03
C7	1110- 15	CM05D151J03
C7	1110- 15	CM05D101J03
C9	1104- 26	150D686X0015R2
C9	1104- 26	150D686X0015R2
C9	1104- 26	150D686X0015R2
C9	1104- 26	150D686X0015R2
C10	1110- 14	150D103X0035A2
C10	1110- 14	150D103X0035A2
C10	1110- 14	192P10392
C10	1110- 14	192P10392
C10	1110- 14	192D10392
C11	1107- 13	55C32A2
C11	1107- 13	192P10392
C11	1107- 13	55C32A2
C11	1107- 13	192P10392
C11	1107- 13	192P10392
C12	1107- 14	55C32A2
C12	1107- 14	192P10392
C12	1107- 14	55C32A2
C12	1107- 14	192P10392
C12	1107- 14	192P10392
C13	1107- 18	33C2
C13	1107- 18	192P10392
C13	1107- 18	33C2
C13	1107- 18	192P10392
C13	1107- 18	192P10392
C14	1107- 17	150D105X0035A2
C14	1107- 17	CS13BF105M
C15	1107- 9	150D225X0020A2
C15	1107- 9	CS13BF105M
C15	1107- 9	192P10392
C16	1106- 23	189-6-8
C17	1106- 22	189-6-8
C18	1106- 20	189-6-8
C23	1109- 23	189-6-8
C24	1109- 21	189-6-8
C25	1109- 19	189-6-8
C26	1109- 25	189-6-8
C27	1109- 27	189-6-8
C28	1109- 29	189-6-8
C29	1109- 15	DM15F511J300W4CR
C31	1110- 4	CM05D270J03
C32	1110- 5	DM20F152J500WV
C33	1109- 3	150D225X0020A2
C34	1110- 16	CM05D271J03
C34	1110- 16	CC35UJ391F
C34	1110- 16	CM05D391J03
C34	1110- 16	CM05D361J03
C34	1110- 16	CM05D271J03
C34	1110- 16	CC35UJ391F
C34	1110- 16	CM05D391J03
C34	1110- 16	CM05D361J03
C34	1110- 16	CM05D361J03
C35	1110- 17	301-000R3A0-150J
C35	1110- 17	CC30UJ131G
C35	1110- 17	CC20CK020D
C35	1110- 17	CC30UJ131G
C35	1110- 17	CC20CK020D
C36	1110- 20	189-6-8
C37	1110- 10	CC20CH100D
C37	1110- 10	CC20CH070D
C37	1110- 10	CC20CH100D
C37	1110- 10	CC20CH070D
C38	1110- 13	DM19D431F03
C38	1110- 13	CM06FD431F03
C38	1110- 13	CM19D431F03
C39	1110- 12	CC32SH121G
C39	1110- 12	CC32UJ361F
C39	1110- 12	CC32SH121G
C39	1110- 12	CC32UJ361F
C39	1110- 12	CC32UJ361F
C40	1110- 22	189-6-8
C41	1110- 11	301-000P3K0-100D
C41	1110- 11	301-000P3K0-100D
C41	1110- 11	301N4200-85DEGC5PFPORM-25PF
C41	1110- 11	301N4200-85DEGC5PFPORM-25PF
C42	1110- 6	CM19D621F03
C42	1110- 6	CM06D102G03
C42	1110- 6	DM19D621F03

SYMBOL INDEX

SYMBOL	FIG. - ITEM	PART NUMBER
C42	1110- 6	CM06D102G03
C42	1110- 6	CM06D102G03
C43	1110- 7	DM19D561F03
C43	1110- 7	DM19D561F03
C43	1110- 13	CC32CG510J
C43	1110- 13	CC32CG510J
C44	1110- 24	189-6-8
C45	1110- 8	CC20UJ100C
C45	1110- 8	CC20UJ100C
C45	1110- 8	301-000P3K0-100D
C45	1110- 8	301-000P3K0-100D
C45	1110- 8	301-000P3K0-100D
C45	1110- 8	301N4200-85DEGC5PFP0RM-25PF
C45	1110- 8	301N4200-85DEGC5PFP0RM-2.5PF
C45	1110- 8	301N4200-85DEGC5PFP0RM-2.5PF
C46	1105- 58	150D105X0035A2
C46	1105- 58	150D106X0020B2
C46	1105- 58	150D105X0035A2
C46	1105- 58	150D106X0020B2
C46	1105- 58	150D106X0020B2
C47	1105- 5	150D225X0020A2
C47	1105- 5	150D225X0020A2
C47	1105- 5	192P10392
C47	1105- 5	192P10392
C47	1105- 5	192P10392
C48	1105- 13	150D103X0035A2
C48	1105- 13	150D103X0035A2
C48	1105- 13	DM15F511J300W4CR
C48	1105- 13	192P10392
C48	1105- 13	192P10392
C48	1105- 13	192P10392
C49	1105- 56	CS13BF105M
C50	1105- 11	150D225X0020A2
C50	1105- 11	150D225X0020A2
C50	1105- 11	192P10392
C50	1105- 11	192P10392
C50	1105- 11	192P10392
C51	1105- 18	150D104X0035A2
C51	1105- 18	150D104X0035A2
C51	1105- 18	192P10392
C51	1105- 18	192P10392
C51	1105- 18	192P10392
C52	1105- 23	150D105X0035A2
C52	1105- 23	150D103X0035A2
C52	1105- 23	150D104X0035A2
C52	1105- 23	150D105X0035A2
C52	1105- 23	150D103X0035A2
C52	1105- 23	150D104X0035A2
C52	1105- 23	150D104X0035A2
C52	1105- 23	192P10392
C52	1105- 23	192P10392
C53	1105- 31	150D104X0035A2
C53	1105- 31	150D104X0035A2
C53	1105- 31	192P10392
C53	1105- 31	192P10392
C53	1105- 31	192P10392
C54	1105- 24	150D105X0035A2
C54	1105- 24	150D105X0035A2
C54	1105- 24	192P10392
C54	1105- 24	192P10392
C54	1105- 24	192P10392
C55	1105- 46	CS13BF105M
C56	1105- 72	DM20F152J500WV
C57	1105- 33	150D104X0035A2
C58	1105- 30	150D104X0035A2
C59	1105- 50	150D104X0035A2
C59	1107- 6C	192P10392
C60	1103- 36	150D227X0010S2
C60	1103- 36	600D227G007DD4
C60	1103- 36	150D337X0006S2
C60	1103- 36	150D227X0010S2
C60	1103- 36	600D227G007DD4
C60	1103- 36	150D337X0006S2
C60	1103- 36	150D337X0006S2
C61	1105- 59	150D225X0020A2
C62	1102- 7	CM05D121J03
C63	1102- 6	CS13BF105M
C64	1102- 11	DM15F511J300W4CR
C65	1102- 5	DM15F511J300W4CR
C66	1105- 14	CS13BF105M
C67	1104- 28	150D686X0020S2
C67	1104- 28	150D476X0035S2
C67	1104- 28	600D506G040DD4
C67	1104- 28	150D476X0035S2
C67	1104- 28	600D506G040DD4
C67	1104- 28	600D506G040DD4
C68	1104- 22	CL26BE400UN3
C68	1104- 22	CL26BE400UN3
C68	1104- 20	150D226X0035R2
C68	1104- 20	150D276X9020R2
C68	1104- 20	150D226X0035R2
C68	1104- 20	150D276X9020R2
C68	1104- 20	150D276X9020R2
C69	1104- 42	151D235X9050X2
C69	1104- 42	CL26BJ2R5TN3
C70	1104- 8	CS13BF105M
C71	1104- 5	150D476X0020R2
C71	1104- 5	600D476G030KD4
C71	1104- 5	150D476X0020R2
C71	1104- 5	600D476G030KD4
C72	1104- 51	CS13BF105M
C73	1104- 14	150D476X0020R2
C73	1104- 14	600D476G030KD4
C73	1104- 14	150D476X0020R2
C73	1104- 14	150D476X0020R2
C73	1104- 14	600D476G030KD4
C73	1104- 14	150D476X0020R2
C73	1104- 14	150D476X0020R2
C74	1104- 35	CL26BJ2R5TN3
C74	1104- 35	CL23CJ1R5TN3
C75	1103- 17	150D225X0020A2
C76	1103- 30	109D106X0050C2
C76	1103- 30	109D305X9075C2
C76	1103- 30	150D335X0015A2
C76	1103- 30	109D305X9075C2
C76	1103- 30	150D335X0015A2
C76	1103- 30	150D335X0015A2
C77	1103- 28	109D106X0050C2
C77	1103- 28	109D305X9075C2
C77	1103- 28	150D335X0015A2
C77	1103- 28	109D305X9075C2
C77	1103- 28	150D335X0015A2
C77	1103- 28	150D335X0015A2

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SYMBOL	FIG. - ITEM	PART NUMBER
C78	1101- 19	151D284X9035W2
C78	1101- 19	151D284X9035W2
C79	1103- 21	150D106X0020B2
C79	1103- 21	150D106X0020B2
C79	1103- 21A	150D225X0035B2
C79	1103- 21A	150D225X0035B2
C79	1103- 21A	150D225X0035B2
C80	1103- 24	150D106X0020B2
C81	1103- 35	600D157G015DD4
C81	1103- 35	150D157X0015S2
C81	1103- 35	600D157G015DD4
C81	1103- 35	150D157X0015S2
C81	1103- 35	150D157X0015S2
C82	1104- 69	151D344X0035W2
C82	1104- 69	151D504X0035W2
C82	1104- 69	151D754X0035X2
C82	1104- 69	151D115X0035X2
C82	1104- 69	151D164X0035W2
C82	1104- 69	151D115X0035X2
C82	1104- 69	151D164X0035W2
C82	1104- 69	151D164X0035W2
C83	1103- 9	CS13BF105M
C83	1103- 9	CS13BF105M
C83	1103- 9	CS13BF105M
C83	1103- 9	150D105X0035A2
C83	1103- 9	150D104X0035A2
C83	1103- 9	CS13BF105M
C83	1103- 9	150D105X0035A2
C83	1103- 9	150D104X0035A2
C84	1103- 7	150D334X0035A2
C85	1103- 4	150D476X0020R2
C86	1101- 58	150D475X0010A2
C87	1101- 21	CL24BE201UP3
C87	1101- 21	150D686X0020S2
C87	1101- 21	CL24BE201UP3
C87	1101- 21	150D106X0020B2
C87	1101- 21	150D106X0020B2
C87	1101- 21	150D686X0020S2
C87	1101- 21	150D686X0020S2
C88	1104- 2	150D476X0020R2
C88	1104- 2	600D476G030KD4
C88	1104- 2	600D157G015DD4
C88	1104- 2	150D476X0020R2
C88	1104- 2	600D476G030KD4
C88	1104- 2	150D686X0020S2
C88	1104- 2	600D157G015DD4
C88	1104- 2	600D157G015DD4
C89	1102- 4	CM05D220J03
C90	1109- 2	CC20CH180J
C91	1109- 7	CC20CH180J
C92	1109- 10	CC20CH180J
C93	1109- 17	CC20CH100D
C93	1109- 17	CC20CH150G
C93	1109- 17	CC20CH150J
C93	1109- 17	CC20CH100D
C93	1109- 17	CC20CH150G
C93	1109- 17	CC20CH150J
C93	1109- 17	CC20CH150J
C94	1109- 16	CC20CH180J
C95	1109- 12	CC20CH150G
C95	1109- 12	CC20CH100D
C95	1109- 12	CC20CH150J
C95	1109- 12	CC20CH150G
C95	1109- 12	CC20CH150J
C95	1109- 12	CC20CH150J
C96	1109- 11	DM20F822J100WV
C97	1108- 7	301N3300-85DEGC20PFPORM 25PCT
C97	1108- 7	301-000R3A0-240J
C97	1108- 7	301N3300-85DEGC20PFPORM 25PCT
C97	1108- 7	301N4200-85C15PFPORM5P
C97	1108- 7	301N3300-85DEGC20PFPORM 25PCT
C97	1108- 7	301-000R3A0-240J
C97	1108- 7	301N3300-85DEGC20PFPORM 25PCT
C97	1108- 7	301N4200-85C15FPORM5PCT C5PCT
C97	1108- 7	301N3300-85DEGC20PFPORM
C97	1108- 7	301N4200-85C15PFPORM5PCT
C97	1108- 7	CC20CH180J
C97	1108- 7	CC20CH150G
C97	1108- 7	CC20CH150G
C98	1108- 8	301-000R3K0-200J
C98	1108- 8	301-000R3A0-200J
C98	1108- 8	301-000R3K0-200J
C98	1108- 8	301-000R3A0-200J
C98	1108- 8	301-000R3A0-200J
C98	1108- 8	CC20CH180J
C98	1108- 8	CC20CH180J
C99	1104- 19	CL24BE600UP3
C99	1104- 19	CL24BE600UP3
C100	1106- 10	301-000R3A0-240J
C100	1106- 10	CC20UJ240G
C101	1106- 12	CC20UJ240G
C102	1106- 18	CC20UJ240G
C102	1106- 18	CC20CH050D
C102	1106- 18	CC20CH050D
C103	1104- 57	33C41
C104	1104- 67	CM07D203J03
C104	1104- 67	55C30
C104	1104- 67	CM07D203J03
C104	1104- 67	55C30
C104	1104- 67	55C30
C107	1105- 20	CS13BF105M
C108	1105- 22	150D104X0035A2
C108	1105- 22	150D103X0035A2
C108	1105- 22	150D104X0035A2
C108	1105- 22	150D103X0035A2
C108	1105- 22	192P10392
C108	1105- 22	192P10392
C108	1105- 22	192P10392
C109	1105- 19	150D105X0035A2
C109	1105- 19	150D105X0035A2
C109	1105- 19	192P10392
C109	1105- 19	192P10392
C109	1105- 19	192P10392
C110	1105- 4	150D103X0035A2
C110	1105- 4	150D103X0035A2
C110	1105- 4	DM15F511J300W4CR
C110	1105- 4	192P10392
C110	1105- 4	DM15F511J300W4CR
C110	1105- 4	192P10392
C110	1105- 4	192P10392
C111	1101- 66	151D284X9035W2

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SYMBOL	FIG. - ITEM	PART NUMBER
C111	1101- 66	151D284X9035W2
C112	1104- 11	150D157X0015S2
C112	1104- 11	600D157G015DD4
C112	1104- 11	150D157X0015S2
C112	1104- 11	600D157G015DD4
C112	1104- 11	600D157G015DD4
C113	1104- 17	150D106X0020B2
C114	1104- 16	150D106X0020B2
C115	1105- 64	CS13BF105M
C116	1104- 62	150D476X0020R2
C116	1104- 62	600D476G030KD4
C116	1104- 62	150D476X0020R2
C116	1104- 62	150D476X0020R2
C116	1104- 62	600D476G030KD4
C116	1104- 62	150D476X0020R2
C116	1104- 62	150D476X0020R2
C117	1105- 41	150D104X0035A2
C118	1106- 4	CS13BF105M
C119	1104- 23	150D157X0015S2
C119	1104- 23	600D157G015DD4
C119	1104- 23	150D157X0015S2
C119	1104- 23	150D157X0015S2
C119	1104- 23	600D157G015DD4
C119	1104- 23	150D157X0015S2
C119	1104- 23	150D157X0015S2
C119	1106- 25	CM06D302F03
C120	1104- 32	CS13BF105M
C121	1104- 30	CS13BF105M
C122	1104- 13	192P10492
C122	1104- 13	192P10492
C122	1104- 13	192P10492
C122	1104- 13	150D104X0035A2
C122	1104- 13	151D114X0035W2
C122	1104- 13	150D104X0035A2
C122	1104- 13	151D114X0035W2
C123	1104- 61	150D105X0035A2
C123	1104- 61	150D105X0035A2
C124	1105- 65	CS13BF105M
C125	1103- 16A	150D155X0020A2
C125	1103- 16A	150D155X0020A2
C125	1103- 16A	150D155X0020A2
C125	1103- 39	150D107X0010R2
C125	1103- 39	150D107X0010R2
C126	1108- 11	301N4200-85DEGC5PFPORM-25PF
C126	1108- 11	301N4200-85DEGC5PFPORM-2·5PF
C126	1108- 11	301N4200-85DEGC5PFPORM-2 5PF
C126	1108- 11	CC20CH050C
C126	1108- 11	CC20CH050C
C127	1105- 32	150D103X0035A2
C127	1105- 32	150D103X0035A2
C127	1105- 32	192P10392
C127	1105- 32	192P10392
C127	1105- 32	192P10392
C128	1102- 10	CS13BF105M
C129	1110- 10	301-000R3A0-509C
C129	1110- 10	301-000R3A0-509C
C130	1107- 1A	CM05C100K03
C130	1107- 1A	CM06F681J03
C130	1107- 1A	CM06FD152J03
C130	1107- 6A	D155C100K0
C130	1107- 6A	CM05D271J03
C131	1101- 58A	CM06D202J03
C131	1101- 58A	CM06D302J03
C131	1101- 58A	CM06D302F03
C133	1106- 5	805-014X5V0103Z
C133	1106- 5	151D113X0035W2
C133	1106- 5	805-014X5V0103Z
C133	1106- 5	151D113X0035W2
C133	1106- 5	150D104X0035A2
C133	1106- 5	150D104X0035A2
C133	1106- 5	192P10392
C133	1106- 5	192P10392
C133	1106- 5	192P10392
C137	1106- 31	855-502X5V0203Z
C137	1106- 31	150D223X0035A2
C137	1106- 31	150D223X0035A2
C137	1106- 31	150D223X0035A2
C137	1106- 31	855-502X5V0203Z
C137	1106- 31	150D223X0035A2
C137	1106- 31A	192P10392
C137	1106- 31A	192P10392
C138	1106- 11	CM05F271J03
C139	1107- 13A	CM05D391J03
C140	1103- 33A	150D156X0020B2
C140	1103- 33A	150D106X0020B2
C140	1103- 33A	150D225X0020A2
C140	1103- 33A	150D475X0010A2
C140	1103- 33A	150D156X0020B2
C140	1103- 33A	150D106X0020B2
C140	1103- 33A	150D225X0020A2
C140	1103- 33A	150D475X0010A2
C140	1103- 33A	150D475X0010A2
C141	1103- 39	150D157X0015S2
C141	1103- 39	600D157G015DD4
C141	1103- 39	150D157X0015S2
C141	1103- 39	150D157X0015S2
C141	1103- 39	600D157G015DD4
C141	1103- 39	150D157X0015S2
C141	1103- 39	150D157X0015S2
C142	1107- 21A	CM05C180K03
C143	1107- 21C	CM05D101J03
C144	1107- 21D	CM05D470J03
C144	1107- 21D	CM05D820J03
C145	1104- 6A	150D474X0035A2
C145	1104- 6A	150D474X0035A2
C146	1104- 64A	600D405F200KD4
C146	1104- 64A	600D405F200KD4
C146	1104- 64A	600D405F200KD4
C147	1103- 2A	150D396X9010B2
C147	1103- 2A	150D396X9010B2
C147	1103- 2A	150D396X9010B2
C148	1104- 44A	CM05D331K03
C148	1104- 44A	CM05D331K03
C148	1104- 44A	CM05D331K03
C149	1107- 4A	150D105X0035A2
C150	1104- 34B	CM05D331K03
C150	1104- 34B	D153F561K0
C150	1104- 34B	D155F331K0
C150	1104- 34B	D153F561K0
C150	1104- 34B	D153F561K0
C151	1104- 77A	150D476X0020R2
C151	1104- 77A	150D686X0015R2
C151	1104- 77A	150D107X0010R2

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SYMBOL	FIG. - ITEM	PART NUMBER	SYMBOL	FIG. - ITEM	PART NUMBER
C151	1104- 77A	CS13BD566K	L6	1107- 3	MS90539-15
C152	1109- 1	CM06D392J03	L6	1107- 3	MS90539-08
C152	1109- 1	192P10392	L7	1109- 1	4422-9-36
C152	1109- 1	CM06F392J03	L7	1109- 1	4422-11-117
C152	1109- 1	192P10392	L7	1109- 1	4422-9-36
C152	1109- 1	192P10392	L7	1109- 1	4422-11-117
C153	1104- 77B	150D476X0020R2	L8	1109- 8	LT4K043
C153	1104- 77B	150D686X0015R2	L8	1109- 8	LT4K046
C153	1104- 77B	150D107X0010R2	L8	1109- 8	LT4K043
C153	1104- 77B	CS13BD566K	L8	1109- 8	LT4K046
C154	1106- 43	GA7-7UUFPORM5PCT	L8	1109- 8	LT4K046
C154	1106- 43	GA7-7UUFPORM5PCT	L11	1102- 3	S88076
C154	1106- 43	GA7-7UUFPORM5PCT	L11	1102- 3	MPF054-31
C155	1106- 44	GA7-7UUFPORM5PCT	L11	1102- 3	S88076
C155	1106- 44	GA7-7UUFPORM5PCT	L11	1102- 3	MPF054-31
C155	1106- 44	GA7-7UUFPORM5PCT	L12	1104- 47	MS90541-04
C156	1103- 14A	150D476X0006B2	L13	1104- 48	MS90541-04
C156	1103- 14A	150D476X0006B2	L14	1104- 59	MS90541-04
C156	1103- 14A	150D476X0006B2	L15	1104- 46	MS90541-04
C157	1105- 71A	CM05D361J03	L17	1107- 24	MS90539-15
C157	1105- 71A	CM05D361J03	L17	1107- 24	MS90539-08
C157	1105- 71A	CM05D361J03	L17	1107- 24	MS90539-15
C158	1105- 57A	CS13BF105M	L17	1107- 24	MS90539-08
C158	1105- 57A	CS13BF105M	L18	1101- 34	LT7K203
C158	1105- 57A	CS13BF105M	L22	1105- 73	MS90539-15
C159	1107- 6C	192P10392	L24	1104- 29	MS90540-07
C160	1107- 24A	192P10392	L25	1101- 5B	4412-13-36
C160	1107- 24A	192P10392	L26	1101- 5C	LT4K046
C161	1107- 21D	CM06D392J03	L27	1106- 27	MS90538-17
C161	1107- 21D	CM06D392J03	L28	1106- 26	MS90538-09
C162	1107- 3	CM06D561J03	L29	1106- 28	MS90538-01
C162	1107- 3	CM06D561J03	L30	1106- 25	LT4K048
C163	1106- 8	150D104X0035A2	L31	1106- 8	LT4K041
C163	1106- 8	192P10392	L32	1104- 78	A16634
C165	1106- 12A	CM05C120K03	L32	1104- 78	A16634
C166	1108- 11A	CC20CH120K	L32	1104- 78	A16634
C167	1106- 9B	CC20CH050D	L33	1101- 20A	MS90539-08
C167	1106- 9B	CC20UJ030P	L33	1101- 20A	MS90539-08
C168	1106- 11A	CC20CH050D	L33	1101- 20A	MS90539-08
C168	1106- 11A	CC20UJ030P	L35	1106- 3A	1537-48
C169	1106- 18A	CC20CH050D	L36	1106- 3B	1537-48
C169	1106- 18A	CC20UJ030P	MG1	1111-149	665-55-84-1
C170	1101- 6W	GA1-5MMFD201	MG1	1111-149	ST10009-4
C170	1101- 6W	GA1-0MMFD201	MG1	1111-149	6229-70-02
C171	1101- 6N	CM04ED270J03	Q1	1101- 45	2N1285
C172	1101- 6T	DM15F511K0	Q1	1101- 45	2N3638A
C173	1101- 6S	D153F751K0	Q1	1101- 45	2N1285
C174	1101- 6D	150D105X0035A2	Q1	1101- 45	2N3638A
C175	1101- 6A	CM04FD271J03	Q1	1101- 45	2N3638A
C176	1107- 5A	150D106X0020B2	Q2	1101- 43A	2N1285
C176	1107- 5A	150D106X0020B2	Q2	1101- 43A	2N3638A
J1	1101- 6	PT02A10-6P	Q2	1101- 43A	2N1285
J2	1101- 7	PT02A12-10P	Q2	1101- 43A	2N3638A
J3	1101- 68	DPXB45-34P0201	Q2	1101- 43A	2N3638A
K1	1101- 6F	3SBC1016A2	Q3	1101- 44	2N1285
L1	1107- 2	MS90541-11	Q3	1101- 44	2N3638A
L1	1107- 2	MS90540-07	Q3	1101- 44	2N1285
L1	1107- 2	MS90540-07	Q3	1101- 44	2N3638A
L2	1106- 27	LT4K044	Q3	1101- 44	2N3638A
L3	1110- 19	X270-2	Q4	1101- 43	2N1285
L4	1110- 21	X271-2	Q4	1101- 43	2N3638A
L5	1110- 23	X272-2	Q4	1101- 43	2N1285
L6	1107- 3	MS90540-07	Q4	1101- 43	2N3638A
L6	1107- 3	MS90539-15	Q4	1101- 43	2N3638A

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SYMBOL	FIG. - ITEM	PART NUMBER
Q5	1101- 46	2N1285
Q5	1101- 46	2N3638A
Q5	1101- 46	2N1285
Q5	1101- 46	2N3638A
Q5	1101- 46	2N3638A
Q6	1101- 47	2N1285
Q6	1101- 47	2N2905A
Q6	1101- 47	2N2905A
Q6	1101- 47	2N1285
Q6	1101- 47	2N2905A
Q6	1101- 47	2N2905A
Q6	1101- 47	2N2905A
Q6	1101- 47	2N2905A
Q7	1101- 38	2N1285
Q7	1101- 38	2N3638A
Q7	1101- 38	2N1285
Q7	1101- 38	2N3638A
Q7	1101- 38	2N3638A
Q8	1101- 39	2N1285
Q8	1101- 39	2N3638A
Q8	1101- 39	2N1285
Q8	1101- 39	2N3638A
Q8	1101- 39	2N3638A
Q9	1101- 40	2N1285
Q9	1101- 40	2N3638A
Q9	1101- 40	2N1285
Q9	1101- 40	2N3638A
Q9	1101- 40	2N3638A
Q10	1101- 41	2N1285
Q10	1101- 41	2N3638A
Q10	1101- 41	2N1285
Q10	1101- 41	2N3638A
Q10	1101- 41	2N3638A
Q11	1101- 42	2N1285
Q11	1101- 42	2N3638A
Q11	1101- 42	2N1285
Q11	1101- 42	2N3638A
Q11	1101- 42	2N3638A
Q12	1101- 24	2N525
Q12	1101- 24	2N3638A
Q12	1101- 24	2N525
Q12	1101- 24	2N3638A
Q12	1101- 24	2N3638A
Q13	1101- 23	2N525
Q13	1101- 23	2N3638A
Q13	1101- 23	2N525
Q13	1101- 23	2N3638A
Q13	1101- 23	2N3638A
Q14	1101- 18	2N158A
Q14	1101- 18	2N2270
Q14	1101- 18	2N158A
Q14	1101- 18	2N2270
Q14	1101- 18	2N2270
Q15	1101- 25	2N333
Q15	1101- 25	2N1711
Q15	1101- 25	2N333
Q15	1101- 25	2N1711
Q15	1101- 25	2N1711
Q16	1101- 26	2N333
Q16	1101- 26	2N1711
Q16	1101- 26	2N333
Q16	1101- 26	2N1711
Q16	1101- 26	2N1711
Q17	1101- 27	2N525
Q17	1101- 27	2N3638A
Q17	1101- 27	2N525
Q17	1101- 27	2N3638A
Q17	1101- 27	2N3638A
Q18	1101- 28	2N525
Q18	1101- 28	2N3638A
Q18	1101- 28	2N525
Q18	1101- 28	2N3638A
Q18	1101- 28	2N3638A
Q19	1101- 29	2N333
Q19	1101- 29	2N1711
Q19	1101- 29	2N333
Q19	1101- 29	2N1711
Q19	1101- 29	2N1711
Q20	1101- 30	2N333
Q20	1101- 30	2N1711
Q20	1101- 30	2N333
Q20	1101- 30	2N1711
Q20	1101- 30	2N1711
Q21	1101- 22	2N1285
Q21	1101- 22	2N3638A
Q21	1101- 22	2N1285
Q21	1101- 22	2N3638A
Q21	1101- 22	2N3638A
Q22	1104- 74	2N158A
Q22	1104- 74	2N1131
Q22	1104- 74	2N158A
Q22	1104- 74	2N1131
Q22	1104- 74	2N1131
Q23	1104- 77	2N174
Q24	1104- 70	2N158A
Q24	1104- 70	2N2405
Q24	1104- 70	2N158A
Q24	1104- 70	2N2405
Q24	1104- 70	2N2405
Q25	1104- 71	2N158A
Q25	1104- 71	2N2405
Q25	1104- 71	2N158A
Q25	1104- 71	2N2405
Q25	1104- 71	2N2405
Q26	1101- 32	2N525
Q26	1101- 32	2N3638A
Q26	1101- 32	2N525
Q26	1101- 32	2N3638A
Q26	1101- 32	2N3638A
Q27	1101- 31	2N525
Q27	1101- 31	2N3638A
Q27	1101- 31	2N525
Q27	1101- 31	2N3638A
Q27	1101- 31	2N3638A
Q28	1104- 73	2N158A
Q28	1104- 73	2N2405
Q28	1104- 73	2N158A
Q28	1104- 73	2N2405
Q28	1104- 73	2N2405
Q29	1104- 72	2N158A
Q29	1104- 72	2N2405
Q29	1104- 72	2N158A
Q29	1104- 72	2N2405
Q29	1104- 72	2N2405
Q30	1104- 1	2N174
Q31	1101- 33	2N341

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SYMBOL	FIG. - ITEM	PART NUMBER
Q31	1101- 33	2N2405
Q31	1101- 33	2N341
Q31	1101- 33	2N2405
Q31	1101- 33	2N2405
Q32	1101- 6M	2N3638A
Q33	1101- 6G	2N1711
RT1	1105- 61	416H17
RT1	1105- 61	763F28
RT1	1105- 61	416H17
RT1	1105- 61	763F28
RT1	1105- 61	763F28
RT2	1107- 11	763F93
RT2	1107- 11	763F93
RT3	1103- 37	763F89
RT4	1103- 38	997F17
RT4	1103- 38	997F17
RT5	1105- 53	997F17
RT5	1105- 53	763F28
RT5	1105- 53	997F17
RT5	1105- 53	763F28
RT5	1105- 53	763F28
R1	1108- 5	RC07GF103K
R2	1108- 4	RC07GF102K
R3	1108- 2	RC07GF272K
R3	1108- 2	RC07GF182K
R4	1107- 16	RC07GF103K
R4	1107- 16	RC07GF563K
R4	1107- 16	RC07GF103K
R4	1107- 16A	RC07GF563K
R4	1107- 16A	RC07GF563K
R5	1107- 6	RC07GF391K
R5	1107- 6	RC07GF391K
R6	1107- 10	RC07GF221K
R6	1107- 10	RC07GF102K
R6	1107- 10	RC07GF222K
R6	1107- 10	RC07GF472K
R6	1107- 10	RC07GF221K
R7	1107- 6	RC07GF392K
R7	1107- 7	RN60D3160F
R7	1107- 7	RN60D3160F
R7	1108- 7	RC07GF392K
R8	1107- 4	RC07GF103K
R8	1107- 4	RC07GF103K
R9	1107- 21	RC07GF182K
R10	1107- 1	224L1-502
R13	1106- 3	RC07GF152K
R14	1106- 30	RC07GF123K
R14	1106- 30	RC07GF103K
R14	1106- 30	RC07GF103K
R15	1109- 6	RC07GF393K
R15	1109- 6	RC07GF103K
R15	1109- 6	RC07GF393K
R15	1109- 6	RC07GF103K
R15	1109- 6	RC07GF103K
R16	1109- 5	RC07GF184K
R16	1109- 5	RC07GF223K
R16	1109- 5	RC07GF184K
R16	1109- 5	RC07GF223K
R16	1109- 5	RC07GF223K
R17	1109- 9	RC07GF123K
R18	1110- 1	RC07GF103K
R19	1110- 3	RC07GF222K
R20	1110- 2	RC07GF273K
R21	1109- 4	RC07GF103K
R21	1109- 4	RC07GF393K
R21	1109- 4	RC07GF103K
R21	1109- 4	RC07GF393K
R21	1109- 4	RC07GF393K
R22	1105- 3	RC07GF153K
R22	1105- 3	RC07GF153K
R22	1105- 3	RC07GF153K
R23	1105- 2	RC07GF222K
R24	1105- 7	RC07GF153K
R25	1105- 57	RC07GF221K
R25	1105- 57	RC07GF101K
R25	1105- 57	RC07GF221K
R25	1105- 57	RC07GF101K
R25	1105- 57	RC07GF101K
R26	1105- 10	RC07GF123K
R26	1105- 10	RC07GF103K
R26	1105- 10	RC07GF123K
R26	1105- 10	RC07GF103K
R26	1105- 10	RC07GF103K
R27	1105- 9	RC07GF153K
R28	1105- 8	RC07GF222K
R29	1105- 21	RC07GF223K
R29	1105- 21	RC07GF123K
R29	1105- 21	RC07GF223K
R29	1105- 21	RC07GF123K
R29	1105- 21	RC07GF123K
R30	1105- 48	RC07GF222K
R31	1105- 49	RC07GF102K
R32	1105- 28	RC07GF153K
R33	1105- 27	RC07GF123K
R34	1105- 26	RC07GF102K
R34	1105- 26	RC07GF561K
R34	1105- 26	RC07GF102K
R34	1105- 26	RC07GF561K
R34	1105- 26	RC07GF561K
R35	1105- 25	RC07GF152K
R36	1105- 38	RC07GF563K
R37	1105- 39	RC07GF563K
R38	1105- 36	RC07GF273K
R39	1105- 34	RC07GF562K
R40	1105- 40	RC07GF332K
R40	1105- 40	RC07GF272K
R40	1105- 40	RC07GF332K
R40	1105- 40	RC07GF272K
R40	1105- 40	RC07GF272K
R41	1105- 44	RN60D4222F
R42	1105- 29	RN60D5621F
R43	1103- 16	RN60D1001F
R44	1102- 2	RC07GF822K
R45	1102- 8	RC07GF822K
R46	1103- 15	RC07GF221K
R47	1103- 14	RC07GF152K
R48	1102- 9	RC07GF103K
R49	1104- 21	RC07GF681K
R49	1104- 21	RC07GF102K
R49	1104- 21	RC07GF681K
R49	1104- 21	RC07GF102K
R49	1104- 21	RC07GF102K

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SYMBOL	FIG. - ITEM	PART NUMBER
R50	1104- 27	RN60D18R2F
R50	1104- 27	RN60D18R2F
R50	1104- 27	RN65D18R7F
R52	1104- 31	RC07GF822K
R54	1104- 10	RC07GF471K
R55	1104- 9	RC07GF123K
R56	1104- 56	RC07GF102K
R57	1104- 55	RC07GF151K
R58	1104- 53	RC07GF222K
R59	1104- 50	RC07GF123K
R60	1104- 52	RC07GF102K
R61	1104- 49	RC07GF151K
R62	1104- 36	RC20GF150K
R62	1104- 36	RC07GF150K
R62	1104- 36	RC20GF150K
R62	1104- 36	RC07GF150K
R62	1104- 36	RC07GF150K
R63	1104- 12	RC20GF150K
R63	1104- 12	RC07GF150K
R63	1104- 12	RC20GF150K
R63	1104- 12	RC07GF150K
R63	1104- 12	RC07GF150K
R64	1107- 5	RC07GF103K
R64	1107- 5	RC07GF103K
R65	1103- 27	RC07GF332K
R66	1103- 18	RC07GF472K
R66	1103- 18	RC07GF472K
R66	1103- 18	RC07GF472K
R66	1103- 19	RC07GF103K
R66	1103- 19	RC07GF103K
R67	1103- 20	RC07GF683K
R67	1103- 20	RC07GF683K
R67	1103- 26A	RC07GF223K
R67	1103- 26A	RC07GF223K
R67	1103- 26A	RC07GF223K
R68	1103- 29	RC07GF332K
R69	1103- 19	RC07GF103K
R69	1103- 19	RC07GF103K
R69	1103- 19	RC07GF103K
R69	1103- 33	RC07GF681K
R69	1103- 33	RC07GF681K
R70	1103- 21	RC07GF392K
R70	1103- 21	RC07GF392K
R70	1103- 21	RC07GF392K
R70	1103- 32	RC07GF392K
R70	1103- 32	RC07GF392K
R71	1103- 31	RC07GF822K
R72	1103- 25	RC07GF472K
R73	1103- 26	RC07GF681K
R74	1104- 43	RC20GF330K
R74	1104- 43	RC07GF680K
R74	1104- 43	RC07GF331K
R74	1104- 43	RC20GF330K
R74	1104- 43	RC07GF680K
R74	1104- 43	RC07GF331K
R74	1104- 43	RC07GF331K
R75	1104- 68	RC20GF222K
R75	1104- 68	RC07GF562K
R75	1104- 68	RC20GF222K
R75	1104- 68	RC07GF562K
R75	1104- 68	RC07GF562K
R76	1104- 44	EB51G5
R76	1104- 44	RC07GF150K
R76	1104- 44	EB51G5
R76	1104- 44	RC07GF150K
R76	1104- 44	RC07GF150K
R77	1104- 41	EB51G5
R77	1104- 41	RC07GF150K
R77	1104- 41	EB51G5
R77	1104- 41	RC07GF150K
R77	1104- 41	RC07GF150K
R78	1103- 10	RC07GF563K
R79	1103- 11	RC07GF392K
R79	1103- 11	RC07GF472K
R79	1103- 11	RC07GF392K
R79	1103- 11	RC07GF472K
R79	1103- 11	RC07GF472K
R80	1103- 12	RC07GF821K
R80	1103- 12	RC07GF561K
R80	1103- 12	RC07GF681K
R80	1103- 12	RC07GF122K
R80	1103- 12	RC07GF102K
R80	1103- 12	RC07GF821K
R80	1103- 12	RC07GF561K
R80	1103- 12	RC07GF681K
R80	1103- 12	RC07GF122K
R80	1103- 12	RC07GF102K
R80	1103- 12	RC07GF122K
R80	1103- 12	RC07GF102K
R81	1103- 8	RC07GF182K
R82	1103- 6	BC23129
R83	1103- 5	RC07GF122K
R84	1103- 2	RC07GF222K
R85	1103- 3	RC07GF471K
R86	1103- 1	RC07GF391K
R87	1101- 20	RC20GF681K
R87	1101- 20	RC07GF122K
R87	1101- 20	RC20GF681K
R87	1101- 20	RC07GF122K
R87	1101- 20	RC07GF122K
R88	1101- 57	RC07GF121K
R88	1101- 57	RC07GF472K
R88	1101- 57	RC07GF121K
R88	1101- 57	RC07GF472K
R88	1101- 57	RC07GF472K
R89	1101- 56	RC32GF120K
R90	1105- 1	BC23130
R91	1107- 12	RC07GF152K
R92	1104- 66	RW69V8R2
R93	1104- 64	RC07GF221K
R94	1104- 63	RC07GF272K
R95	1107- 8	RC07GF272K
R95	1107- 8	RC07GF221K
R95	1107- 8	RC07GF272K
R95	1107- 8	RC07GF221K
R95	1107- 8	RC07GF221K
R96	1103- 13	RN60D1002F
R96	1103- 13	RN55D8251F
R96	1103- 13	RN60D1002F
R96	1103- 13	RN55D8251F
R96	1103- 13	RN55D8251F
R97	1108- 1	RC07GF472K
R97	1107- 7C	RC07GF472K
R98	1107- 15	RC07GF102K
R98	1107- 15	RC07GF103K
R98	1107- 15	RC07GF103K

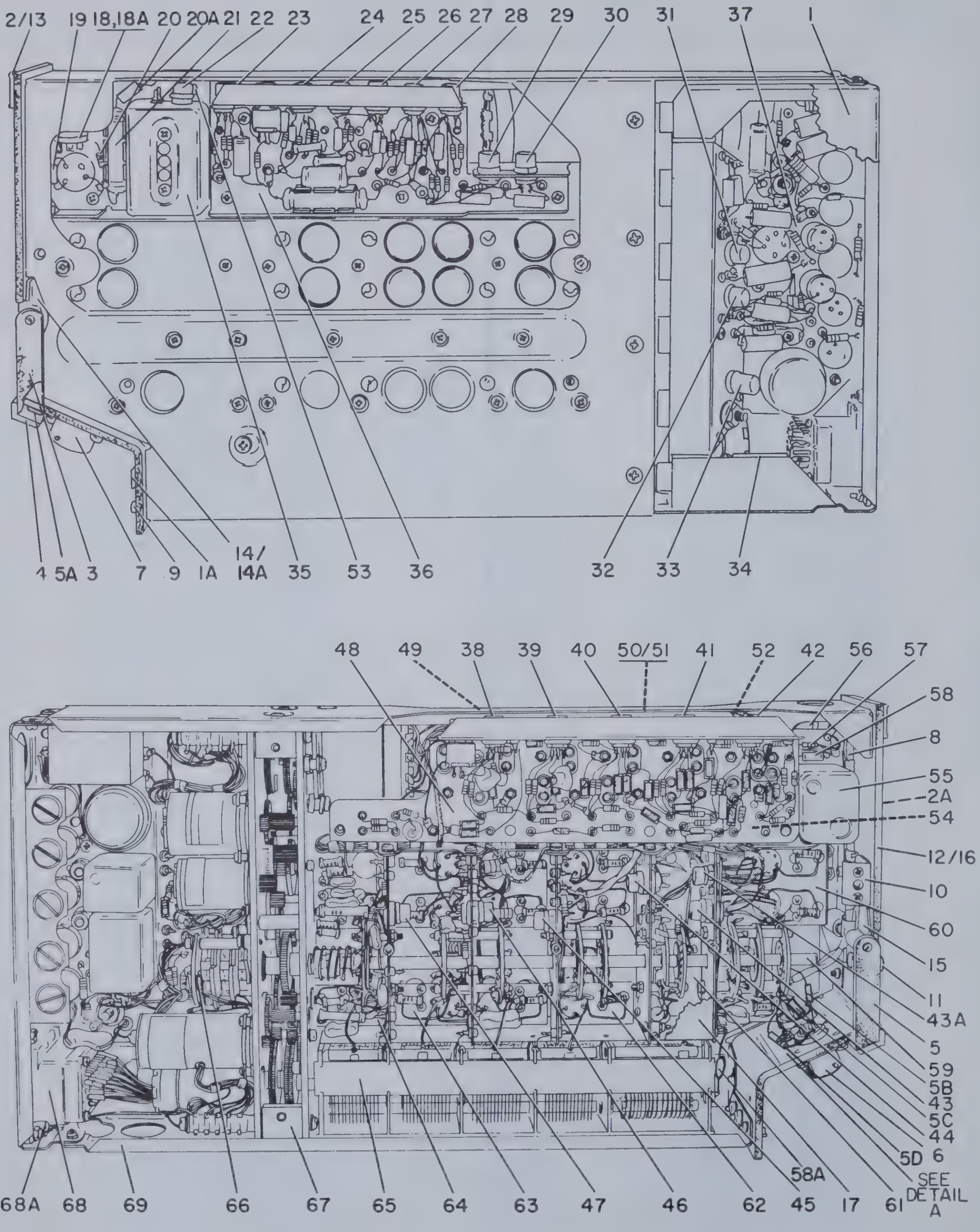
SYMBOL INDEX

SYMBOL	FIG. - ITEM	PART NUMBER
R98	1107- 15	RC07GF102K
R98	1107- 15	RC07GF103K
R100	1105- 55	RC07GF331K
R100	1105- 55	RC07GF121K
R100	1105- 55	RC07GF331K
R100	1105- 55	RC07GF121K
R100	1105- 55	RC07GF121K
R101	1104- 40	RC07GF562K
R101	1104- 40	RC07GF562K
R102	1105- 51	RC07GF472K
R102	1105- 51	RC07GF222K
R102	1105- 51	RC07GF472K
R102	1105- 51	RC07GF222K
R102	1105- 51	RC07GF222K
R103	1105- 47	RC07GF221K
R104	1105- 43	RC07GF221K
R105	1106- 6	RC07GF682K
R106	1105- 6	RC07GF822K
R107	1105- 12	RC07GF822K
R108	1105- 15	RC07GF273K
R109	1105- 16	RC07GF562K
R110	1105- 17	RC07GF152K
R111	1104- 39	G1473
R113	1104- 4	RC07GF222K
R114	1104- 54	RC07GF391K
R115	1104- 34	RC07GF561K
R116	1105- 52	RC07GF124K
R117	1106- 29	RC07GF221K
R118	1105- 60	RC07GF153K
R118	1105- 60	RC07GF152K
R118	1105- 60	RC07GF153K
R118	1105- 60	RC07GF152K
R118	1105- 60	RC07GF152K
R119	1104- 20	RW69V161
R119	1104- 20	RW69V161
R120	1104- 25	RC32GF331K
R120	1104- 25	RC32GF122K
R120	1104- 25	RW69V181
R120	1104- 25	RC32GF122K
R122	1104- 15	RC07GF100K
R122	1104- 15	RC07GF150K
R122	1104- 15	RC07GF100K
R122	1104- 15	RC07GF150K
R122	1104- 15	RC07GF150K
R123	1104- 15A	RC07GF221K
R124	1104- 33	RC07GF821K
R124	1104- 33	RC07GF152K
R124	1104- 33	RC07GF821K
R124	1104- 33	RC07GF152K
R124	1104- 33	RC07GF152K
R125	1104- 24	RC20GF271K
R125	1104- 24	RC07GF680K
R125	1104- 24	RC20GF271K
R125	1104- 24	RC07GF680K
R125	1104- 24	RC07GF680K
R126	1105- 62	RC07GF102K
R127	1105- 63	RC07GF102K
R128	1104- 58	RC20GF220K
R129	1103- 18	RC07GF222K
R129	1103- 18	RC07GF222K
R129	1103- 20	RC07GF272K
R129	1103- 20	RC07GF272K
R129	1103- 20	RC07GF272K
R130	1103- 23	RC07GF102K
R130	1103- 23	RC07GF472K
R130	1103- 23	RC07GF102K
R130	1103- 23	RC07GF472K
R130	1103- 23	RC07GF472K
R130	1103- 34	RC07GF103K
R130	1103- 34	RC07GF103K
R131	1104- 38	G2513
R132	1104- 34A	RC07GF682K
R132	1104- 34A	RC07GF682K
R133	1104- 56A	RC07GF222K
R133	1104- 56A	RC07GF182K
R133	1104- 56A	RC07GF272K
R133	1104- 56A	RC07GF332K
R133	1104- 56A	RC07GF152K
R133	1104- 56A	RC07GF392K
R134	1107- 2A	RC07GF153K
R134	1107- 2A	RC07GF471K
R134	1107- 4A	RC07GF153K
R134	1107- 4A	RC07GF103K
R134	1107- 4A	RC07GF332K
R135	1106- 2	RC07GF223K
R135	1106- 2	RC07GF123K
R135	1106- 2	RC07GF223K
R135	1106- 2	RC07GF123K
R135	1106- 2	RC07GF123K
R136	1106- 1	224L1-202
R137	1106- 7	RC07GF682K
R137	1106- 7B	RC07GF682K
R138	1107- 3A	RC07GF681K
R139	1104- 12A	RC07GF221K
R139	1104- 12A	RC07GF221K
R140	1104- 14A	RC07GF222K
R140	1104- 14A	RC07GF222K
R141	1107- 24A	RC07GF103K
R141	1107- 24A	RC07GF272K
R141	1107- 24A	RC07GF103K
R143	1106- 9	RC07GF472K
R143	1106- 9	RC07GF392K
R144	1107- 21B	RC07GF392K
R145	1103- 2B	RC07GF222K
R145	1103- 2B	RC07GF222K
R145	1103- 2B	RC07GF222K
R146	1105- 9A	RC07GF102K
R146	1105- 9A	RC07GF102K
R146	1105- 9A	RC07GF102K
R147	1106- 2A	RC07GF221K
R148	1106- 3A	RC07GF221K
R149	1106- 7A	RC07GF682K
R150	1107- 7A	RC07GF562K
R151	1107- 7B	RC07GF182K
R152	1106- 9A	RC07GF680K
R152	1106- 9A	RC07GF680K
R153	1107- 7C	RC07GF332K
R154	1107- 21A	RC07GF563K
R157	1104- 45	RC07GF680K
R158	1101- 6C	RC07GF682K
R159	1101- 6Q	RC07GF822K
R160	1101- 6L	RC07GF822K

SYMBOL INDEX

SYMBOL	FIG. - ITEM	PART NUMBER
R161	1101- 6K	RC07GF103K
R162	1101- 6J	RC07GF103K
R163	1101- 6U	RC07GF104K
R164	1101- 6V	RC07GF822K
R165	1104- 32A	RC07GF561K
R165	1104- 32A	RC07GF561K
R166	1105- 13A	RC07GF102K
R167	1105- 23A	RC07GF102K
R183	1106- 3A	RN60D3830F
R168	1107- 5B	RC07GF101K
R168	1107- 5B	RC07GF101K
R169	1105- 18A	RC07GF124K
R170	1106- 27A	RC07GF472K
R171	1101- 5	RC07GF392K
R182	1106- 3B	RN60D3830F
S1A	1106- 13	235431F
S1B	1106- 14	235432F
S1C	1106- 16	235401F
S1D	1107- 22	235437F
S1D	1107- 22	237946F
S1D	1107- 23	237946F
SIE	1107- 22	235433F
S1E	1107- 22	268451F
SIE	1107- 23	235437F
S1E	1107- 23	268451F
S1F	1108- 9	235434F
S1G	1108- 10	235436F
S1I	1109- 13	235438F
S1J	1110- 9	235402FC
S1K	1111- 14	235798K
S1L	1111- 13	235796K
S1M	1111- 9	235797K
S1N	1106- 14	232666F
S1N	1106- 15	232666F
S1P	1109- 14	232068F
S1R	1106- 13	232667F
S10	1106- 15	232067F
T1	1108- 16	X273-3
T3	1108- 12	X275-2
T4	1106- 24	X893
T5	1106- 21	X892
T6	1106- 19	X891
T8	1109- 20	X852
T9	1109- 18	X853
T10	1109- 24	X282-2
T10	1109- 24	X851-T107
T10	1109- 24	X282-2
T10	1109- 24	X851-T10
T10	1109- 24	X851-T10
T11	1109- 26	X283-2
T12	1109- 28	X284-3
T13	1105- 66	X489-2
T14	1105- 67	X489-2
T15	1105- 68	X489-2
T16	1105- 69	X489-2
T17	1105- 70	X489-2
T18	1104- 75	A12598
T19	1104- 76	A12591
T2	1108- 14	X274-3
T20	1101- 55	A12599
T21	1107- 6B	65-136
T21	1107- 6B	65-136
T104	1106- 24	X854
T105	1106- 19	X856
T105	1106- 21	X855
T107	1109- 22	X851-T10
T107	1109- 22	X851-T10
T108	1109- 20	X852
T109	1109- 18	X853
R169	1105- 18A	RC07GF124K
XQ1	1108- 19	05-3307-01
XQ2	1106- 33	05-3307-01
XQ3	1107- 27	05-3307-01
XQ4	1106- 33A	05-3307-01
XQ4	1106- 33A	05-3307-51
XQ4	1106- 33A	05-3307-01
XQ4	1106- 33A	05-3307-51
XQ5	1109- 31	05-3307-01
XQ6	1110- 26	05-3307-001
XQ7-XQ11	1105- 76	05-3307-01
XQ12,XQ13	1103- 43	05-3307-51
XQ15-XQ2	1103- 43	05-3307-51
XQ21	1102- 15	05-3307-01
XQ26,XQ27	1104- 81	05-3307-51
XQ31	1104- 81	05-3307-51
Y1	1102- 12	289-2197-000
Y2	1101- 6P	CR37AU100-000KC
Z1	1105- 71	X487-2
Z2	1104- 78	BC3178
Z2	1104- 78	BC3178

GROUP ASSEMBLY PARTS LIST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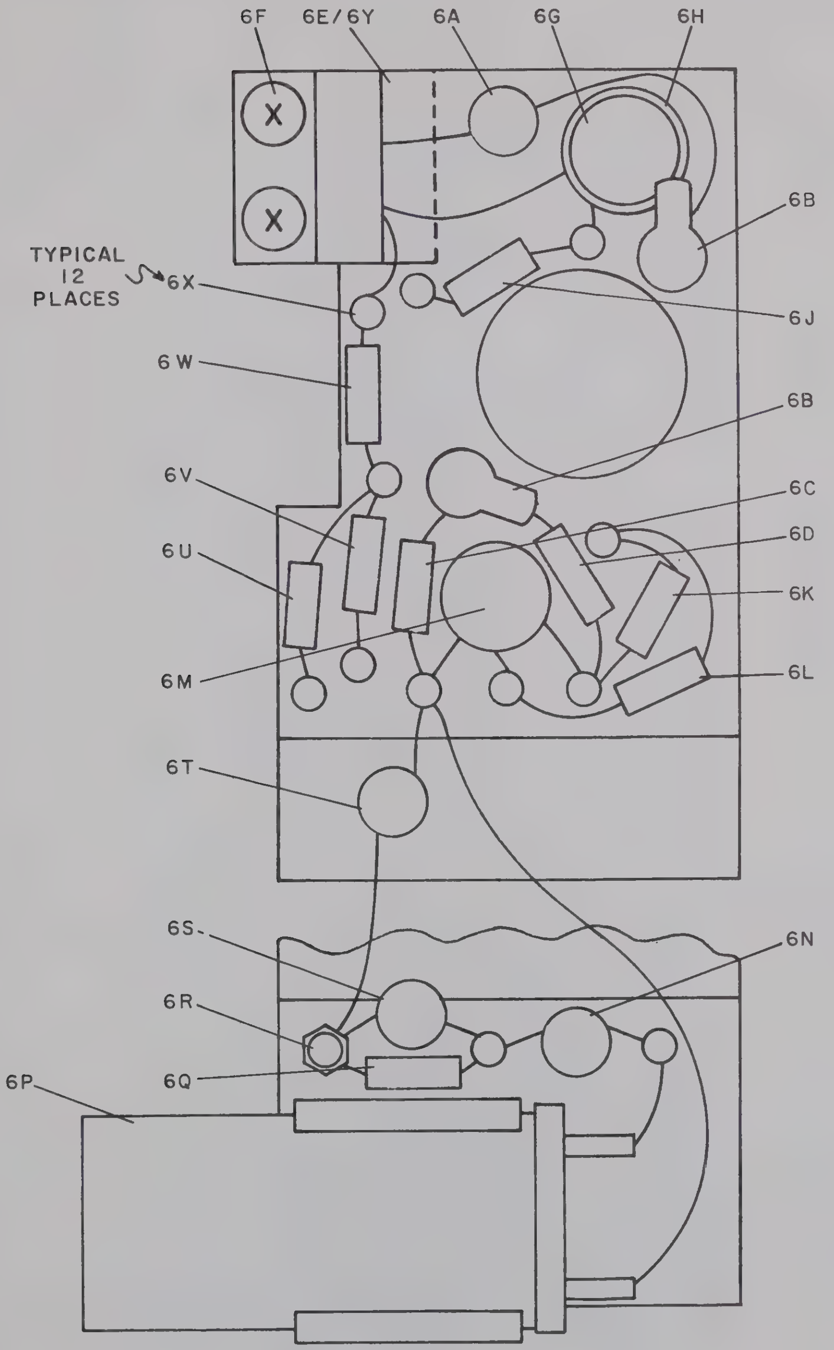
51Y-4/4A ADF Receiver (Sheet 1 of 2)
Figure 1101

GROUP ASSEMBLY PARTS LIST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6U
6K
6M
6L
6T
6S
6N
6R
6P
6Q

(SELF TEST OSCILLATOR UNIT)
DETAIL A

51Y-4/4A ADF Receiver
"Detail A" (Sheet 2 of 2)
Figure 1101

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1101 - 0	522-1836-000	1	51Y-4 ADF RADIO RECEIVER	1	A
1101 - 0	522-2587-000	1	51Y-4A ADF RADIO RECEIVER	1	B
1101 - 0	522-2587-013	1	51Y-4A ADF RADIO RECEIVER	1	C
1	549-4171-004	2	CASE, RCVR	1	
	330-3677-000	2	SCREW, ASSEMBLED WASHER, SST, PAN HD, 6-32 X 5/16 COML AP	2	
	MS51957-27	2	SCREW, MACH., SST, PAN HD, 6-32 X 5/16 343-0168-000 AP	1	
	545-7533-003	2	WASHER AP	1	
	548-3954-002	2	INSULATOR AP	1	
1A	553-2329-003	2	PLATE, IDENT EFF MCN 107	1	A
1A	548-7693-003	2	PLATE, IDENT	1	B,C
	P347-1269-000	2	SCREW, MACH., SST, FIL H, 2-56 X 5/16 77250 347-1269-000 AP	1	
	P347-0018-000	2	SCREW, MACH., SST, FIL H, 2-56 X 3/16 77250 347-0018-000 AP	1	
2	549-3514-002	2	STRIP, IDENT	1	A
2	548-7694-003	2	STRIP, IDENT	1	B,C
R 2A	280-3778-010	2	CHART, INFORMATION 93108	1	
3	549-3934-004	2	HANDLE ASSY EFF THRU MCN 809	1	A
3	554-3948-001	2	HANDLE ASSY EFF MCN 810	1	A
3	549-3934-004	2	HANDLE ASSY EFF THRU MCN 299	1	B
3	554-3948-001	2	HANDLE ASSY EFF MCN 300	1	B
3	554-3948-001	2	HANDLE ASSY	1	C
	MS16632-1012	2	RING 340-0112-000 EFF MCN 221 THRU 809 ONLY SB22 AP	2	A
	MS16632-1012	2	RING 340-0112-000 EFF THRU MCN 299 ONLY SB22 AP	2	B
	549-3905-002	2	PIN, STR, HDLS EFF THRU MCN 809 AP	2	A
	761-5190-001	2	PIN, HINGE EFF MCN 810 SB22 AP	2	A
	549-3905-002	2	PIN, STR, HDLS EFF THRU MCN 299 AP	2	B
	761-5190-001	2	PIN, HINGE EFF MCN 300 AP	2	B
	761-5190-001	2	PIN, HINGE AP	2	C
	549-3906-002	2	SPRING, HELICAL, TORSION EFF THRU MCN 809 ONLY AP	1	A
	549-3906-002	2	SPRING, HELICAL, TORSION EFF THRU MCN 299 ONLY AP	1	B
	549-3907-002	2	SPRING, HELICAL, TORSION EFF THRU MCN 809 ONLY AP	1	A
	549-3907-002	2	SPRING, HELICAL, TORSION EFF THRU MCN 299 ONLY AP	1	B
	302-0638-020	2	WASHER, NM, RUB., 0.195 ID, 0.375 OD COML EFF MCN 810 AP	4	A
	302-0638-020	2	WASHER, NM, RUB., 0.195 ID, 0.375 OD COML EFF MCN 300 AP	4	B
	302-0638-020	2	WASHER, NM, RUB., 0.195 ID, 0.375 OD COML AP	4	C
	F22NM107-62	2	NUT, SELF-LKG, HEX., CAD. PL STL, 6-32 72962 333-1069-000 EFF MCN 810 AP	2	A
	F22NM107-62	2	NUT, SELF-LKG, HEX., CAD. PL STL, 6-32 72962 333-1069-000 EFF MCN 300 AP	2	B
	F22NM107-62	2	NUT, SELF-LKG, HEX., CAD. PL STL, 6-32 72962 333-1069-000 AP	2	C,D
4	549-3909-003	3	GRIP BAR	1	
5	549-3914-003	3	STRAP, HANDLE EFF THRU MCN 809	1	A
5	761-5188-001	3	STRAP, HANDLE EFF MCN 810	1	A
5	549-3914-003	3	STRAP, HANDLE EFF THRU MCN 299	1	B
5	761-5188-001	3	STRAP, HANDLE EFF MCN 300	1	B

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1101 5	761-5188-001	3	STRAP, HANDLE		1	C
	5A	761-5187-001	2	BUMPER, RUB. EFF MCN 810		2	A
	5A	761-5187-001	2	BUMPER, RUB. EFF MCN 300		2	B
	5A	761-5187-001	2	BUMPER, RUB.		2	C
	5B	4412-13-36	2	COIL, RF, 4.70 UH 82142 240-0160-000	L25	1	B,C
	5C	LT4K046	2	COIL, RF, 10 UH 240-0149-000	L26	1	B,C
R	5D	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF THRU MCN 11900	R171	1	B,C
	6	PT02A10-6P	2	CONNECTOR 77820 371-2016-000	J1	1	
		MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		3	A,B
		MS51957-15	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/8 343-0135-000 AP		1	A,B
		MS51957-18	2	SCREW, MACH., SST, PAN HD, 4-40 X 5/8 343-0138-000 AP		3	C
		MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		1	C
		MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		4	
		SPL4040-4HOTTINNED	2	TERMINAL 77147 304-0332-000 AP		1	A,B
		541-5977-002	2	SPACER, SLV AP		3	C
		P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		1	
	6A	CM04FD271J03	2	CAPACITOR, FXD, 270 PF 5%, 500 VDCW 72136 912-3909-000	C175	1	C
	6B	4007-4HOTTINNED	2	TERMINAL 77147 304-0015-000		2	C
	6C	RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000	R158	1	C
	6D	150D105X0035A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000	C174	1	C
	6E	763-8455-001	2	SELF TEST OSCILATOR		1	C
	6F	3SBC1016A2	3	RELAY 01526 974-0479-010	K1	1	C
		P313-0132-000	3	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		2	C
		MS35338-135	3	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		2	C
		MS51957-13	3	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		2	C
	6G	2N1711	3	TRANSISTOR 352-0400-000	Q33	1	C
R	6H	T1532	3	HOLDER 98291 352-9508-000		1	C
	6J	RC07GF103K	3	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R162	1	C
	6K	RC07GF103K	3	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R161	1	C
	6L	RC07GF822K	3	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R160	1	C
	6M	2N3638A	3	TRANSISTOR 352-0636-020	Q32	1	C
	6N	CM04ED270J03	3	CAPACITOR, FXD, 27 PF 5%, 500 VDCW 72136 912-3844-000	C171	1	C
	6P	CR37AU100-000KC	3	XTAL UNIT, QTZ, 100 RHZ 290-8794-000	Y2	1	C
		100-206-2	3	CLIP 99378 139-2370-000 AP		1	C
	6Q	RC07GF822K	3	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R159	1	C
	6R	M426	3	TERMINAL 21242 306-2204-000		1	C
		MS35649-24	3	NUT, PLAIN, HEX., SST, 2-56 313-0037-000 AP		1	C
		MS35338-134	3	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP		1	C

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1101 6S	D153F751K0	3	CAPACITOR, FXD, 750 PF 10%, 300 VDCW 00853 912-4124-040	C173	1	C
	6T	DM15F511K0	3	CAPACITOR, FXD, 510 PF 10%, 500 VDCW 72136 912-2868-000	C172	1	C
	6U	RC07GF104K	3	RESISTOR, FXD, 0.1 MEG 10%, 1/4 W 745-0821-000	R163	1	C
	6V	RC07GF822K	3	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R164	1	C
R	6W	GA1-5MMFD201	3	CAPACITOR, FXD, 1.5 PF 20%, 500 VDCW 78488 913-0389-000 EFF THRU MCN 5193	C170	1	C
R	6W	GA1-0MMFD201	3	CAPACITOR, FXD, 1 PF 20%, 500 VDCW 78488 913-0388-000 EFF MCN 5194	C170	1	C
	6X	SL441-434DWHT	3	TERMINAL 12615 306-2222-100		12	C
	6Y	763-8453-001	3	TERMINAL BOARD		1	C
		549-4082-00	2	WIRING HARNESS		1	
	7	PT02A12-10P	3	CONNECTOR 77820 371-2055-000	J2	1	
		MS51957-13	3	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		4	
		MS35338-135	3	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		4	
	8	541-5178-002	3	BUTTON, CABLE		2	
		P343-0021-000	3	SCREW, MACH., SST, PAN HD, 4-40 X 3/8 77250 COML AP		2	
	9	549-3927-003	2	HOOK, HOLD DOWN		1	
		MS51957-29	2	SCREW, MACH., SST, PAN HD, 6-32 X 7/16 343-0170-000 AP		2	
	10	K1913-06	2	NUT, SELF-LKG, PLATE, CAD. PL STL, 6-32 75237 334-1033-000		1	
		P330-2285-000	2	SCREW, MACH., SST, FH, 2-56 X 1/4 77250 330-2285-000 AP		2	
		68-1660-26	2	NUT, SELF-LKG, HEX., AL, 2-56 72962 333-0604-000 AP		2	
	11	48186BRSBLKNIPL	2	BUTTON 61864 308-4000-000		1	
	12	549-4141-003	2	PANEL, FRONT		1	
		P343-0020-000	2	SCREW, MACH., SST, PAN HD, 4-40 X 5/16 77250 343-0020-000 AP		5	
	13	549-3919-003	3	TRIM STRIP		1	
	14	549-3908-002	3	STRAP, RETAINING EFF THRU MCN 809		1	A
	14	549-3908-002	3	STRAP, RETAINING EFF THRU MCN 299		1	B
	14A	761-5189-001	3	BLOCK, HINGE EFF MCN 810		2	A
	14A	761-5189-001	3	BLOCK, HINGE EFF MCN 300		2	B
	14A	761-5189-001	3	BLOCK, HINGE		2	C
		MS20426AD4-6	3	RIVET, SOLID, AL, 1/8 DIA X 0.375 LG SHK 305-1375-000 AP		4	
	15	549-4150-003	3	BRACKET, ANGLE EFF THRU MCN 809		1	A
	15	554-3955-001	3	BRACKET, ANGLE EFF MCN 810		1	A
	15	549-4150-003	3	BRACKET, ANGLE EFF THRU MCN 299		1	B
	15	554-3955-001	3	BRACKET, ANGLE EFF MCN 300		1	B
	15	554-3955-001	3	BRACKET, ANGLE		1	C
		MS20426AD4-6	3	RIVET, SOLID, AL, 1/8 DIA X 0.375 LG SHK 305-1375-000 AP		2	
	16	549-4159-004	3	PANEL, FRONT		1	
	17	554-5565-004	2	COVER, SHLD		1	C
	17	548-7674-003	2	COVER, SHLD		1	B,C
		MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP		3	

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
'1101		MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		3	
	18	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 659	Q14	1	A
	18	2N2270	2	TRANSISTOR 352-0430-000 EFF MCN 660 SB27	Q14	1	A
	18	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 220	Q14	1	B
	18	2N2270	2	TRANSISTOR 352-0430-000 EFF MCN 221 SB27	Q14	1	B
	18	2N2270	2	TRANSISTOR 352-0430-000	Q14	1	C
	18A	1101A	2	MOUNTING 13103 352-9814-000 EFF MCN 660 THRU 1200 SB27		1	A
	18A	1101	2	MOUNTING 13103 352-9813-000 EFF MCN 1201		1	A
	18A	1101A	2	MOUNTING 13103 352-9814-000 EFF MCN 221 THRU 692 SB27		1	B
	18A	1101	2	MOUNTING 13103 352-9813-000 EFF MCN 693		1	B
	18A	1101	2	MOUNTING 13103 352-9813-000		1	C
		P313-0056-000	2	NUT, PLAIN, HEX., NI PL BRS, 10-32 77250 313-0056-000 SB27 AP		1	A
		P313-0050-000	2	NUT, PLAIN, HEX., NI PL BRS, 2-56 77250 P313-0050-000 AP		1	B,C
		MS35338-138	2	WASHER, LOCK, SST, 0.194 ID, 0.337 OD 310-0284-000 EFF THRU MCN 198 ONLY AP		1	A
		MS35338-138	2	WASHER, LOCK, SST, 0.194 ID, 0.337 OD 310-0284-000 AP		1	B,C
		IMC140	2	INSULATOR 10583 302-0410-000 SB27 AP		2	
		310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML EFF THRU MCN 198 AP		1	A
		310-0059-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.437 OD COML EFF MCN 199 AP		1	A
		310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML AP		1	B,C
		548-9539-003	2	WASHER SB27 AP		1	
		761-0356-001	2	SLEEVE, SPACING EFF MCN 199 AP		1	A
		761-0356-001	2	SLEEVE, SPACING AP		1	B,C
R	19	151D284X9035W2	2	CAPACITOR, FXD, 0.28 UF 10%, 35 VDCW 56289 184-8379-000	C78	1	A
R	19	151D284X9035W2	2	CAPACITOR, FXD, 0.28 UF 10%, 35 VDCW 56289 184-8379-000	C78	1	B,C
	20	RC20GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/2 W 745-1345-000 EFF THRU MCN 659	R87	1	A
	20	RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000 EFF MCN 660 SB27	R87	1	A
	20	RC20GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/2 W 745-1345-000 EFF THRU MCN 220	R87	1	B
	20	RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000 EFF MCN 221 SB27	R87	1	B
	20	RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000	R87	1	C
	20A	MS90539-08	2	COIL, RF, 500 UH 240-2533-000 EFF MCN 2307	L33	1	A
	20A	MS90539-08	2	COIL, RF, 500 UH 240-2533-000 EFF MCN 1861	L33	1	B
	20A	MS90539-08	2	COIL, RF, 500 UH 240-2533-000	L33	1	C

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1101 21	CL24BE201UP3	2	CAPACITOR, FXD, 200 UF P30M15%, 15 VDCW 184-7039-000 EFF THRU MCN 659	C87	1	A
	21	150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 660 THRU 2306 SB27	C87	1	A
R	21	150D686X0020 S2	2	CAPACITOR, FXD, 1 PF 20%, 500 VDCW 56289 184-7665-000 EFF MCN 2307	C87	1	A
	21	CL24BE201UP3	2	CAPACITOR, FXD, 200 UF P30M15%, 15 VDCW 184-7039-000 EFF THRU MCN 220	C87	1	B
	21	150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 221 THRU 1860 SB27	C87	1	B
R	21	150D686X0020 S2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7665-000 EFF MCN 1861	C87	1	B
R	21	150D686X0020 S2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7665-000	C87	1	C
	22	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1687	Q21	1	A
	22	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1688	Q21	1	A
	22	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1038	Q21	1	B
	22	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1039	Q21	1	B
	22	2N3638A	2	TRANSISTOR 352-0636-020	Q21	1	C
	23	2N525	2	TRANSISTOR 352-0094-000 EFF THRU MCN 1687	Q13	1	A
	23	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1688	Q13	1	A
	23	2N525	2	TRANSISTOR 352-0094-000 EFF THRU MCN 1083	Q13	1	B
	23	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1084	Q13	1	B
	23	2N3638A	2	TRANSISTOR 352-0636-020	Q13	1	C
	24	2N525	2	TRANSISTOR 352-0094-000 EFF THRU MCN 1687	Q12	1	A
	24	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1688	Q12	1	A
	24	2N525	2	TRANSISTOR 352-0094-000 EFF THRU MCN 1083	Q12	1	B
	24	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1084	Q12	1	B
	24	2N3638A	2	TRANSISTOR 352-0636-020	Q12	1	C
	25	2N333	2	TRANSISTOR 352-0064-000 EFF THRU MCN 1687	Q15	1	A
	25	2N1711	2	TRANSISTOR 352-0400-000 EFF MCN 1688	Q15	1	A
	25	2N333	2	TRANSISTOR 352-0064-000 EFF THRU MCN 1083	Q15	1	B
	25	2N1711	2	TRANSISTOR 352-0400-000 EFF MCN 1084	Q15	1	B
	25	2N1711	2	TRANSISTOR 352-0400-000	Q15	1	C
	26	2N333	2	TRANSISTOR 352-0064-000 EFF THRU MCN 1687	Q16	1	A
	26	2N1711	2	TRANSISTOR 352-0400-000 EFF MCN 1688	Q16	1	A
	26	2N333	2	TRANSISTOR 352-0064-000 EFF THRU MCN 1083	Q16	1	B
	26	2N1711	2	TRANSISTOR 352-0400-000 EFF MCN 1084	Q16	1	B

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1101 26	2N1711	2	TRANSISTOR 352-0400-000 Q16	1	C
27	2N525	2	TRANSISTOR 352-0094-000 EFF Q17 THRU MCN 1687	1	A
27	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q17 1688	1	A
27	2N525	2	TRANSISTOR 352-0094-000 EFF Q17 THRU MCN 1083	1	B
27	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q17 1084	1	B
27	2N3638A	2	TRANSISTOR 352-0636-020 Q17	1	C
28	2N525	2	TRANSISTOR 352-0094-000 EFF Q18 THRU MCN 1687	1	A
28	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q18 1688	1	A
28	2N525	2	TRANSISTOR 352-0094-000 EFF Q18 THRU MCN 1083	1	B
28	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q18 1084	1	B
28	2N3638A	2	TRANSISTOR 352-0636-020 Q18	1	C
29	2N333	2	TRANSISTOR 352-0064-000 EFF Q19 THRU MCN 1687	1	A
29	2N1711	2	TRANSISTOR 352-0400-000 EFF MCN Q19 1688	1	A
29	2N333	2	TRANSISTOR 352-0064-000 EFF Q19 THRU MCN 1083	1	B
29	2N1711	2	TRANSISTOR 352-0400-000 EFF MCN Q19 1084	1	B
29	2N1711	2	TRANSISTOR 352-0400-000 Q19	1	C
30	2N333	2	TRANSISTOR 352-0064-000 EFF Q20 THRU MCN 1687	1	A
30	2N1711	2	TRANSISTOR 352-0400-000 EFF MCN Q20 1688	1	A
30	2N333	2	TRANSISTOR 352-0064-000 EFF Q20 THRU MCN 1083	1	B
30	2N1711	2	TRANSISTOR 352-0400-000 EFF MCN Q20 1084	1	B
30	2N1711	2	TRANSISTOR 352-0400-000 Q20	1	C
31	2N525	2	TRANSISTOR 352-0094-000 EFF Q27 THRU MCN 1687	1	A
31	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q27 1688	1	A
31	2N525	2	TRANSISTOR 352-0094-000 EFF Q27 THRU MCN 1083	1	B
31	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q27 1084	1	B
31	2N3638A	2	TRANSISTOR 352-0636-020 Q27	1	C
32	2N525	2	TRANSISTOR 352-0094-000 EFF Q26 THRU MCN 1687	1	A
32	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q26 1688	1	A
32	2N525	2	TRANSISTOR 352-0094-000 EFF Q26 THRU MCN 1083	1	B
32	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q26 1084	1	B
32	2N3638A	2	TRANSISTOR 352-0636-020 Q26	1	C
33	2N341	2	TRANSISTOR 352-0153-000 EFF Q31 THRU MCN 1288	1	A
33	2N2405	2	TRANSISTOR 352-0479-000 EFF MCN Q31 1289	1	A
33	2N341	2	TRANSISTOR 352-0153-000 EFF Q31 THRU MCN 729	1	B
33	2N2405	2	TRANSISTOR 352-0479-000 EFF MCN Q31 730	1	B

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1101 33	2N2405	2	TRANSISTOR 352-0479-000	Q31	1	C
34	LT7K203	2	COIL, RF, 27 UH 240-0187-000	L18	1	
35	549-4177-004	2	OSCILLATOR SEE FIG. 1102-0		1	
R 36	549-4189-005	2	AMPLIFIER, AF SEE FIG. 1103-0 EFF THRU MCN 3792		1	A
R 36	777-0372-001	2	AMPLIFIER, AF SEE FIG. 1103-0 EFF MCN 3793		1	A
R 36	549-4189-005	2	AMPLIFIER, AF SEE FIG. 1103-0 EFF THRU MCN 6543		1	B,C
R 36	777-0372-001	2	AMPLIFIER, AF SEE FIG. 1103-0 EFF MCN 6544		1	B,C
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		5	
37	549-4190-005	2	AMPLIFIER, ELECTRONIC CONTROL SEE FIG. 1104-0		1	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		4	
	MS51959-27	2	SCREW, MACH., SST, FH, 6-32 X 5/16 342-0061-000 AP		4	
38	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1687	Q7	1	A
38	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1688	Q7	1	A
38	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1083	Q7	1	B
38	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1084	Q7	1	B
38	2N3638A	2	TRANSISTOR 352-0636-020	Q7	1	C
39	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1687	Q8	1	A
39	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1688	Q8	1	A
39	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1083	Q8	1	B
39	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1084	Q8	1	B
39	2N3638A	2	TRANSISTOR 352-0636-020	Q8	1	C
40	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1687	Q9	1	A
40	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1688	Q9	1	A
40	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1083	Q9	1	B
40	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1084	Q9	1	B
40	2N3638A	2	TRANSISTOR 352-0636-020	Q9	1	C
41	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1687	Q10	1	A
41	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1688	Q10	1	A
41	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1083	Q10	1	B
41	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1084	Q10	1	B
41	2N3638A	2	TRANSISTOR 352-0636-020	Q10	1	C
42	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1687	Q11	1	A
42	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN 1688	Q11	1	A
42	2N1285	2	TRANSISTOR 352-0243-000 EFF THRU MCN 1083	Q11	1	B

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1101 42	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q11 1084	1	B
42	2N3638A	2	TRANSISTOR 352-0636-020 Q11	1	C
43	2N1285	2	TRANSISTOR 352-0243-000 EFF Q4 THRU MCN 1687	1	A
43	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q4 1688	1	A
43	2N1285	2	TRANSISTOR 352-0243-000 EFF Q4 THRU MCN 1083	1	B
43	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q4 1084	1	B
43	2N3638A	2	TRANSISTOR 352-0636-020 Q4	1	C
43A	2N1285	2	TRANSISTOR 352-0243-000 EFF Q2 THRU MCN 1687	1	A
43A	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q2 1688	1	A
43A	2N1285	2	TRANSISTOR 352-0243-000 EFF Q2 THRU MCN 1083	1	B
43A	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q2 1084	1	B
43A	2N3638A	2	TRANSISTOR 352-0636-020 Q2	1	C
44	2N1285	2	TRANSISTOR 352-0243-000 EFF Q3 THRU MCN 1687	1	A
44	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q3 1688	1	A
44	2N1285	2	TRANSISTOR 352-0243-000 EFF Q3 THRU MCN 1083	1	B
44	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q3 1084	1	B
44	2N3638A	2	TRANSISTOR 352-0636-020 Q3	1	C
45	2N1285	2	TRANSISTOR 352-0243-000 EFF Q1 THRU MCN 1687	1	A
45	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q1 1688	1	A
45	2N1285	2	TRANSISTOR 352-0243-000 EFF Q1 THRU MCN 1083	1	B
45	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q1 1084	1	B
45	2N3638A	2	TRANSISTOR 352-0636-020 Q1	1	C
46	2N1285	2	TRANSISTOR 352-0243-000 EFF Q5 THRU MCN 1687	1	A
46	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q5 1688	1	A
46	2N1285	2	TRANSISTOR 352-0243-000 EFF Q5 THRU MCN 1083	1	B
46	2N3638A	2	TRANSISTOR 352-0636-020 EFF MCN Q5 1084	1	B
46	2N3638A	2	TRANSISTOR 352-0636-020 Q5	1	C
47	2N1285	2	TRANSISTOR 352-0243-000 EFF Q6 THRU MCN 1687	1	A
R 47	2N2905A	2	TRANSISTOR 352-0550-000 EFF MCN Q6 1688 THRU 4792	1	A
R 47	2N2905A	2	TRANSISTOR 352-0550-010 EFF MCN Q6 4793	1	A
47	2N1285	2	TRANSISTOR 352-0243-000 EFF Q6 THRU MCN 1084	1	B
R 47	2N2905A	2	TRANSISTOR 352-0550-000 EFF MCN Q6 1085 THRU 8299	1	B
R 47	2N2905A	2	TRANSISTOR 352-0550-010 EFF MCN Q6 8300	1	B
R 47	2N2905A	2	TRANSISTOR 352-0550-000 Q6 EFF THRU MCN 8299	1	C

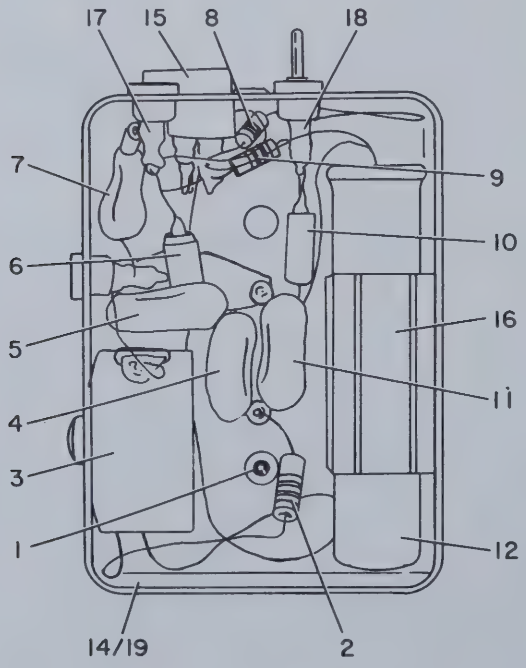
GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1101 47	2N2905A	2	TRANSISTOR 352-0550-010 EFF MCN 8300 Q6	1	C
48	549-4188-005	2	AMPLIFIER, IF SEE FIG. 1105-0	1	A
48	549-4188-006	2	AMPLIFIER, IF SEE FIG. 1105-0	1	B,C
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	7	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	1	
49	RTMT12M	2	TERMINAL 91663 306-0976-000	1	
	MS51959-13	2	SCREW, MACH., SST, FH, 4-40 X 1/4 342-0044-000 AP	1	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	1	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	1	
50	549-6602-002	2	STRAP, RETAINING	1	
51	549-6603-002	2	CONDUIT, METAL, RIGID	1	
	MS51959-13	2	SCREW, MACH., SST, FH, 4-40 X 1/4 342-0044-000 AP FOR 50 AND 51	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP FOR 50 AND 51	1	
	310-0278-000	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP FOR 50 AND 51	1	
52	549-4122-002	2	STRAP, RETAINING	1	
	MS51959-13	2	SCREW, MACH., SST, FH, 4-40 X 1/4 342-0044-000 AP	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	1	
	310-0278-000	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP	1	
53	422-04-22-034-113	2	STRAP 71785 139-0647-000	1	
	MS51959-13	2	SCREW, MACH., SST, FH, 4-40 X 1/4 342-0044-000 AP	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	1	
	310-0278-000	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP	1	
54	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000	1	
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	1	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	1	
55	A12599	2	TRANSFORMER 70674 677-0117-000 T20	1	
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	1	
56	RC32GF120K	2	RESISTOR, FXD, 12 OHMS 10%, 1 W 745-3272-000 SB27 R89	1	
57	RC07GF121K	2	RESISTOR, FXD, 120 OHMS 10%, 1/4 W 745-0716-000 EFF THRU MCN 659 R88	1	A
57	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 660 SB27 R88	1	A
57	RC07GF121K	2	RESISTOR, FXD, 120 OHMS 10%, 1/4 W 745-0716-000 EFF THRU MCN 220 R88	1	B

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1101 57	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 221 SB27	R88	1	B
57	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000	R88	1	C
58	150D475X0010A2	2	CAPACITOR, FXD, 4.7 UF 20%, 10 VDCW 56289 184-7379-000	C86	1	
58A	CM06D202J03	2	CAPACITOR, FXD, 2000 PF 5%, 500 VDCW 912-3022-000 EFF THRU MCN 142	C131	1	B
58A	CM06D302J03	2	CAPACITOR, FXD, 3000 PF 5%, 500 VDCW 912-3037-000 EFF MCN 143	C131	1	B
58A	CM06D302F03	2	CAPACITOR, FXD, 3000 PF 5%, 500 VDCW 912-3037-000	C131	1	C
59	549-4117-002	2	SHAFT, STR		1	
60	554-5566-005	2	AMPLIFIER, RF SEE FIG. 1106-0		1	A
60	548-7678-005	2	AMPLIFIER, RF SEE FIG. 1106-0		1	B,C
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		4	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		1	
	549-4122-002	2	STRAP, RETAINING AP		1	
61	549-4175-004	2	MODULATOR, BALANCED SEE FIG. 1107-0		1	A
61	548-7764-004	2	MODULATOR, BALANCED SEE FIG. 1107-0		1	B,C
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		3	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		1	A
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP		1	B,C
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		1	
	549-4122-002	2	STRAP, RETAINING AP		1	
62	549-4174-004	2	AMPLIFIER, RF SEE FIG. 1108-0		1	A
62	549-4174-005	2	AMPLIFIER, RF SEE FIG. 1108-0		1	B,C
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		4	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		1	
	T957HOTTINNED	2	TERMINAL 79963 304-0045-000 AP		1	
	549-4122-002	2	STRAP, RETAINING AP		1	
63	548-7677-005	2	MIXER STAGE, FREQ SEE FIG. 1109-0		1	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		5	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		1	A
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP		1	B,C
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		1	
	549-4122-002	2	STRAP, RETAINING AP		1	
64	549-4172-004	2	OSCILLATOR, RF SEE FIG. 1110-0		1	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		4	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		1	
	549-4122-002	2	STRAP, RETAINING AP		1	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1101 65	921-0020-00	2	CAPACITOR, VAR, 5 SECT. 77630 C1	1	
	324-1691-020	2	SCREW, CAP, SCH, STL, 6-32 X 3/8 COML AP	1	
	MS51957-26	2	SCREW, MACH., SST, PAN HD, 6-32 X 1/4 343-0167-000 AP	1	
	MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	2	
R 66	151D284X9035 W2	2	CAPACITOR, FXD, 0.28 UF 10%, 35 VDCW 56289 184-8379-000 C111	1	A
R 66	151D284X9035 W2	2	CAPACITOR, FXD, 0.28 UF 10%, 35 VDCW 56289 184-8379-000 C111	1	B,C
67	549-4187-005	2	GEARCASE, MOTOR SEE FIG. 1111-0	1	
	MS51957-26	2	SCREW, MACH., SST, PAN HD, 6-32 X 1/4 343-0167-000 AP	4	
	549-4081-000	2	WIRING HARNESS	1	
68	DPXB45-34P02 01	3	CONNECTOR 71468 370-5200-000 J3	1	
	P313-0132-00 0	3	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	4	
	310-0278-000	3	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP	4	
	MS51957-15	3	SCREW, MACH., SST, PAN HD, 4-40 X 3/8 343-0135-000 AP	4	
68A	T957HOTTINNE D	3	TERMINAL 79963 304-0045-000 AP	2	
69	549-4182-005	2	CHASSIS	1	

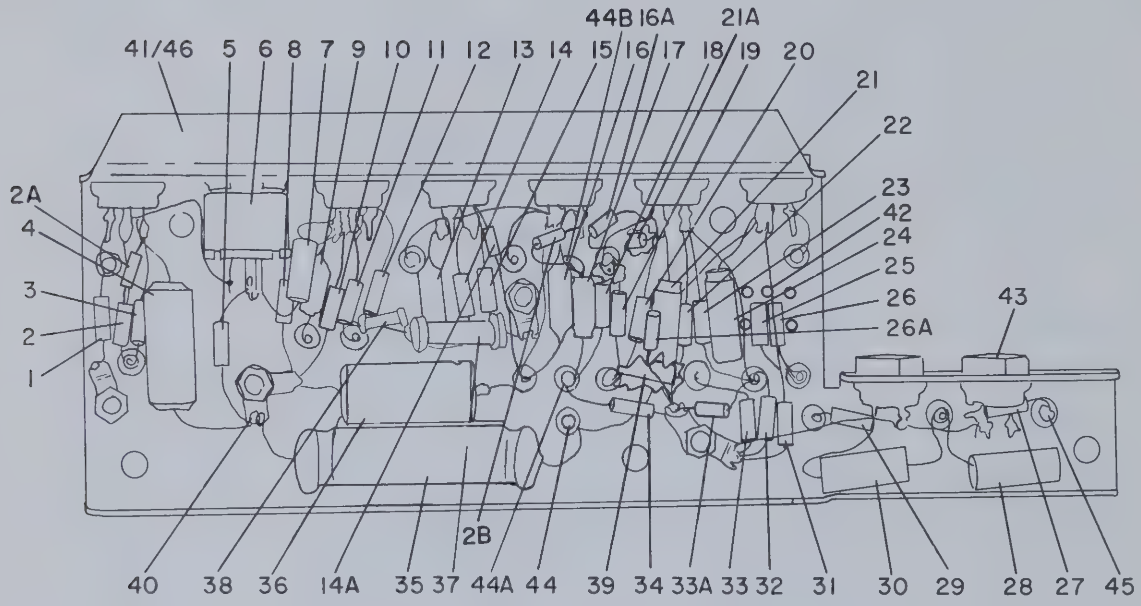


Oscillator
Figure 1102

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1102 - 0	549-4177-004	1	OSCILLATOR SEE FIG. 1101-35 FOR NHA		REF	
1	549-4127-002	2	SLEEVE, SCR CAPTIVATING		2	
	MS51957-20	2	SCREW, MACH., SST, PAN HD, 4-40 X 7/8 343-0140-000 AP		2	
	549-4115-002	2	SPACER, SLV AP		2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		2	
2	RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R44	1	
3	S88076	2	COIL, RF, 10 MH 82068 240-1959-000 EFF THRU MCN 1245	L11	1	A
3	MPF054-31	2	COIL, RF, 10 MH 114025 240-1788-000 EFF MCN 1246	L11	1	A
3	S88076	2	COIL, RF, 10 MH 82068 240-1959-000 EFF THRU MCN 714	L11	1	B
3	MPF054-31	2	COIL, RF 10 MH 11402 240-1788-000 EFF MCN 715	L11	1	B
3	MPF054-31	2	COIL, RF 10 MH 11402 240-1788-000		1	C
	P343-0382-000	2	SCREW, MACH., NI PL BRS, PAN HD, 3-48 X 3/16 77250 343-0382-000 AP		1	
4	CM05D220J03	2	CAPACITOR, FXD, 22 PF 5%, 500 VDCW 912-2768-000	C89	1	
5	DM15F511J300WV4CR	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000	C65	1	
R 6	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000	C63	1	
7	CM05D121J03	2	CAPACITOR, FXD, 120 PF 5%, 500 VDCW 912-2822-000	C62	1	
8	RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R45	1	
9	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R48	1	
R 10	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000	C128	1	
11	DM15F511J3000WV4CR	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000	C64	1	
12	289-2197-000	2	XTAL UNIT, QTZ, 142.500 KHZ 75378	Y1	1	
13		1	DELETED			
14	549-4143-003	2	CAN, SHLD		1	
15	05-3307-01	3	SOCKET 91662 352-9902-000	XQ21	1	
	0004-7202S	3	RETAINER 91662 352-9904-000 AP		1	
16	100-206-2	3	CLIP 99378 139-2370-000		1	
	R4008X3-32CHROMATEDP	3	RIVET, TUBULAR, AL, 0.089 DIA X 3/32 LG SHK 12014 305-0169-000 AP		2	
17	G2621	3	TERMINAL 21242 306-1100-000		7	
18	G2522	3	TERMINAL 12615 306-0323-000		1	
19	549-4142-003	3	CAN, SHLD		1	

GROUP ASSEMBLY PARTS LIST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AF Amplifier
Figure 1103

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1103 - 0	549-4189-005	1	AMPLIFIER, AF SEE FIG. 1101-36 FOR NHA EFF THRU MCN 3792	REF	A
R 1103 - 0	777-0372-001	1	AMPLIFIER, AF SEE FIG. 1101-36 FOR NHA EFF MCN 3793	REF	A
R 1103 - 0	549-4189-005	1	AMPLIFIER, AF SEE FIG. 1101-36 FOR NHA EFF THRU MCN 6543	REF	B,C
R 1103 - 0	777-0372-001	1	AMPLIFIER, AF SEE FIG. 1101-36 FOR NHA EFF MCN 6544	REF	B,C
1	RC07GF391K	2	RESISTOR, FXD, 390 OHMS 10%, 1/4 W 745-0734-000 R86	1	
2	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 R84	1	
2A	150D396X9010 B2	2	CAPACITOR, FXD, 39 UF 10%, 10 VDCW 56289 184-7650-000 EFF MCN 851 SB25 C147	1	A
2A	150D396X9010 B2	2	CAPACITOR, FXD, 39 UF 10%, 10 VDCW 56289 184-7650-000 EFF MCN 344 SB25 C147	1	B
2A	150D396X9010 B2	2	CAPACITOR, FXD, 39 UF 10%, 10 VDCW 56289 184-7650-000 C147	1	C
2B	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF MCN 1056 R145	1	A

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1103 2B	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF MCN 515	R145	1	B
	2B	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	R145	1	C
	3	RC07GF471K	2	RESISTOR, FXD, 470 OHMS 10%, 1/4 W 745-0737-000	R85	1	
	4	150D476X0020R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000	C85	1	
	5	RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000	R83	1	
	6	BC23129	2	RESISTOR, VAR, 1000 OHMS 20%, 1/2 W 71450 380-1670-000	R82	1	
		P334-0266-000	2	NUT, PLAIN, HEX., NI PL BRS, 1/4-32 77250 334-0266-000 AP		1	
		1914-05-00-2480	2	WASHER, LOCK, PH BRZ, 0.267 ID, 0.408 OD 78189 373-0035-000 AP		1	
	7	150D334X0035A2	2	CAPACITOR, FXD, 0.33 UF 20%, 35 VDCW 56289 184-7406-000	C84	1	
	8	RC07GF182K	2	RESISTOR, FXD, 1800 OHMS 10%, 1/4 W 745-0758-000	R81	1	
	9	150D105X0035A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 850	C83	1	A
	9	150D104X0035A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 851 THRU 3299 SB25	C83	1	A
R	9	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000 EFF MCN 3300	C83	1	A
	9	150D105X0035A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 364	C83	1	B
	9	150D104X0035A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 365 THRU 4726 SB25	C83	1	B
R	9	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000 -000 EFF MCN 4727	C83	1	B
R	9	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000	C83	1	C
	10	RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000	R78	1	
	11	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF THRU MCN 659	R79	1	A
	11	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 660 SB27	R79	1	A
	11	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF THRU MCN 220	R79	1	B
	11	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 221 SB27	R79	1	B
	11	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000	R79	1	C
	12	RC07GF821K	2	RESISTOR, FXD, 820 OHMS 10%, 1/4 W 745-0746-000 EFF THRU MCN 668	R80	1	A
	12	RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000 EFF MCN 669 THRU 1687	R80	1	A
	12	RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF MCN 1688 THRU 3299	R80	1	A
R	12	RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000 EFF MCN 3300 THRU 8820	R80	1	A

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
R	1103 12	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4W 745-0749-000 EFF MCN 8821	R80	1	A
	12	RC07GF821K	2	RESISTOR, FXD, 820 OHMS 10%, 1/4 W 745-0746-000 EFF THRU MCN 229	R80	1	B
	12	RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000 EFF MCN 230 THRU 1083	R80	1	B
	12	RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF MCN 1688 THRU 4726	R80	1	B
R	12	RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000 EFF MCN 4727 THRU 8820	R80	1	B
R	12	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4W 745-0749-00 EFF MCN 8821	R80	1	B
R	12	RC07GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1/4 W 745-0752-000 EFF THRU MCN 8820	R80	1	C
R	12	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4W 745-0749-000 EFF MCN 8821	R80	1	C
	13	RN60D1002F	2	RESISTOR, FXD, 10,000 OHMS 1%, 1/4 W 705-6644-000 EFF THRU MCN 1687	R96	1	A
	13	RN55D8251F	2	RESISTOR, FXD, 8250 OHMS 1%, 1/8 W 705-1040-000 EFF MCN 1688	R96	1	A
	13	RN60D1002F	2	RESISTOR, FXD, 10,000 OHMS 1%, 1/4 W 705-6644-000 EFF THRU MCN 1083	R96	1	B
	13	RN55D8251F	2	RESISTOR, FXD, 8250 OHMS 1%, 1/8 W 705-1040-000 EFF MCN 1084	R96	1	B
	13	RN55D8251F	2	RESISTOR, FXD, 8250 OHMS 1%, 1/8 W 705-1040-000	R96	1	C
	14	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R47	1	
	14A	150D476X0006 B2	2	CAPACITOR, FXD, 47 UF 20%, 6 VDCW 56289 184-7401-000 EFF MCN 1688	C156	1	A
	14A	150D476X0006 B2	2	CAPACITOR, FXD, 47 UF 20%, 6 VDCW 56289 184-7401-000 EFF MCN 1085	C156	1	B
	14A	150D476X0006 B2	2	CAPACITOR, FXD, 47 UF 20%, 6 VDCW 56289 184-7401-000	C156	1	C
	15	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	R46	1	
	16	RN60D1001F	2	RESISTOR, FXD, 1000 OHMS 1%, 1/4 W 705-6596-000	R43	1	
	16A	150D155X0020 A2	2	CAPACITOR, FXD, 1.5 UF 20%, 20 VDCW 56289 184-7658-000 EFF MCN 554 SB20	C125	1	A
	16A	150D155X0020 A2	2	CAPACITOR, FXD, 1.5 UF 20%, 20 VDCW 56289 184-7658-000 EFF MCN 174 SB20	C125	1	B
	16A	150D155X0020 A2	2	CAPACITOR, FXD, 1.5 UF 20%, 20 VDCW 56289 184-7658-000	C125	1	C
	17	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000	C75	1	
	18	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF THRU MCN 553 SB20	R129	1	A
	18	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 554 SB20	R66	1	A
	18	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF THRU MCN 173 SB20	R129	1	B

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1103 18	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 174 SB20 R66	1	B
18	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 R66	1	C
19	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 553 SB20 R66	1	A
19	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 554 SB20 R69	1	A
19	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 173 SB20 R66	1	B
19	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 174 SB20 R69	1	B
19	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 R69	1	C
20	RC07GF683K	2	RESISTOR, FXD, 68,000 OHMS 10%, 1/4 W 745-0815-000 EFF THRU MCN 553 SB20 R67	1	A
20	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF MCN 554 SB20 R129	1	A
20	RC07GF683K	2	RESISTOR, FXD, 68,000 OHMS 10%, 1/4 W 745-0815-000 EFF THRU MCN 173 SB20 R67	1	B
20	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF MCN 174 SB20 R129	1	B
20	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 R129	1	C
21	150D106X0020B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF THRU MCN 553 SB20 C79	1	A
21	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF MCN 554 SB20 R70	1	A
21	150D106X0020B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF THRU MCN 173 SB20 C79	1	B
21	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF MCN 174 SB20 R70	1	B
21	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 R70	1	C
21A	150D225X0035B2	2	CAPACITOR, FXD, 2.2 UF 20%, 35 VDCW 56289 184-7397-000 EFF MCN 554 SB20 C79	1	A
21A	150D225X0035B2	2	CAPACITOR, FXD, 2.2 UF 20%, 35 VDCW 56289 184-7397-000 EFF MCN 174 SB20 C79	1	B
21A	150D225X0035B2	2	CAPACITOR, FXD, 2.2 UF 20%, 35 VDCW 56289 184-7397-000 C79	1	C
22	1N457	2	SEMICOND DEVICE 353-0204-000 EFF THRU MCN 553 ONLY SB20 CR13	1	A
22	1N457	2	SEMICOND DEVICE 353-0204-000 EFF THRU MCN 173 ONLY SB20 CR13	1	B
23	1N270	2	SEMICOND DEVICE 353-2018-000 EFF THRU MCN 553 ONLY SB20 CR12	1	A
23	1N270	2	SEMICOND DEVICE 353-2018-000 EFF THRU MCN 173 ONLY SB20 CR12	1	B

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1103 23	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 554 THRU 1687 SB20	R130	1	A
23	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 1688	R130	1	A
23	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 174 THRU 1084 SB20	R130	1	B
23	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 1085	R130	1	B
23	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000	R130	1	C
24	150D106X0020B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000	C80	1	
25	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000	R72	1	
26	RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000	R73	1	
26A	RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF MCN 554 SB20	R67	1	A
26A	RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF MCN 174 SB20	R67	1	B
26A	RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000	R67	1	C
27	RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000	R65	1	
28	109D106X0050C2	2	CAPACITOR, FXD, 10 UF 20%, 50 VDCW 56289 184-7785-000 EFF THRU MCN 106	C77	1	A
28	109D305X9075C2	2	CAPACITOR, FXD, 160 UF 10%, 50 VDCW 56289 184-7803-000 EFF MCN 107 THRU 1246	C77	1	A
28	150D335X0015A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000 EFF MCN 1247	C77	1	A
28	109D305X9075C2	2	CAPACITOR, FXD, 160 UF 10%, 50 VDCW 56289 184-7803-000 EFF THRU MCN 714	C77	1	B
28	150D335X0015A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000 EFF MCN 715	C77	1	B
28	150D335X0015A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000	C77	1	C
29	RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000	R68	1	
30	109D106X0050C2	2	CAPACITOR, FXD, 10 UF 20%, 50 VDCW 56289 184-7785-000 EFF THRU MCN 106	C76	1	A
30	109D305X9075C2	2	CAPACITOR, FXD, 160 UF 10%, 50 VDCW 56289 184-7803-000 EFF MCN 107 THRU 1246	C76	1	A
30	150D335X0015A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000 EFF MCN 1247	C76	1	A
30	109D305X9075C2	2	CAPACITOR, FXD, 160 UF 10%, 50 VDCW 56289 184-7803-000 EFF THRU MCN 714	C76	1	B
30	150D335X0015A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000 EFF MCN 715	C76	1	B

GROUP ASSEMBLY PARTS LIST

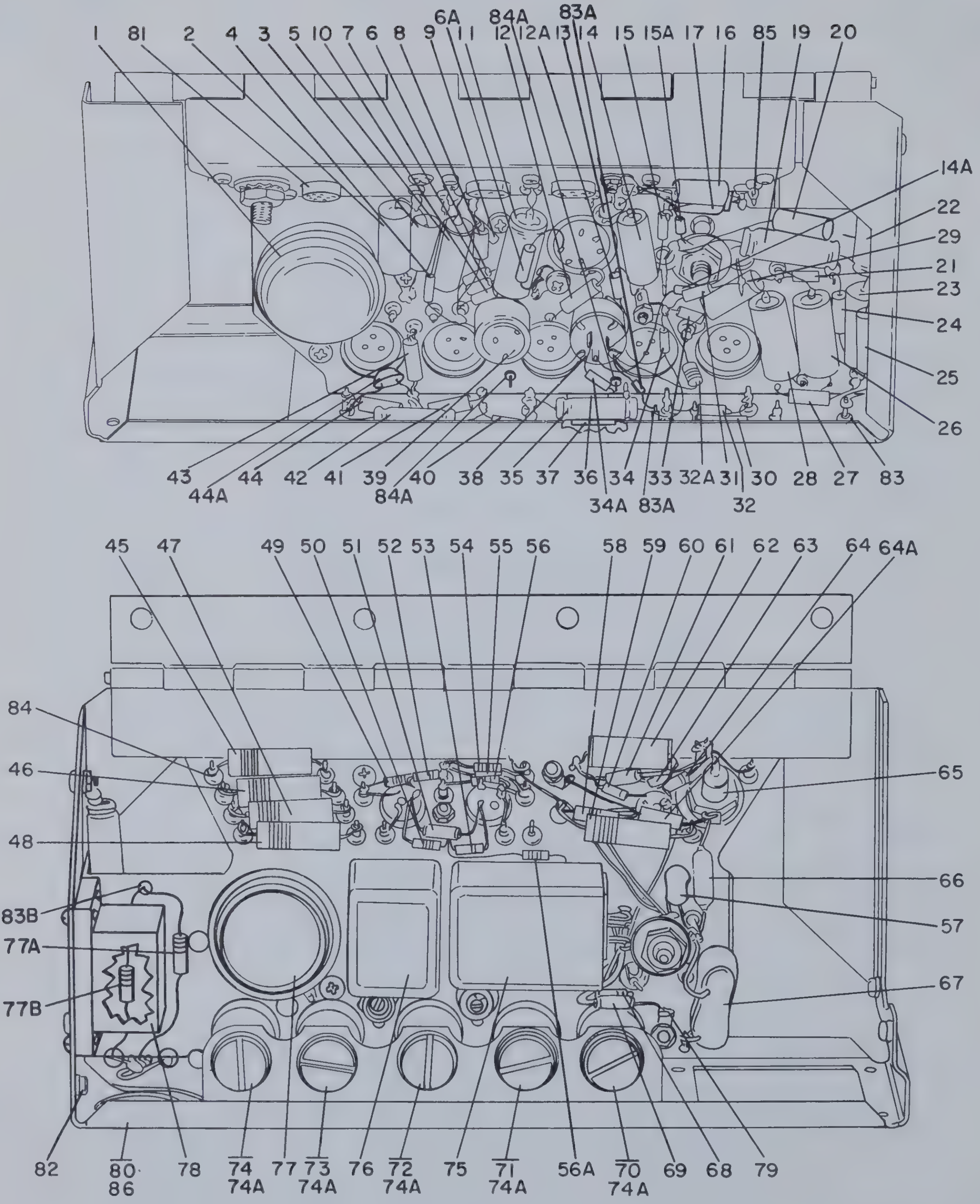
FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1103 30	150D335X0015 A2	2	CAPACITOR, FXD, 3.3 UF 20%, 15 VDCW 56289 184-7403-000 C76	1	C
31	RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000 R71	1	
32	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF THRU MCN 553 SB20 R70	1	A
32	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF THRU MCN 173 SB20 R70	1	B
33	RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF THRU MCN 553 ONLY SB20 R69	1	A
33	RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF THRU MCN 173 ONLY SB20 R69	1	B
33A	150D156X0020 B2	2	CAPACITOR, FXD, 15 UF 20%, 20 VDCW 56289 184-7371-000 EFF MCN 554 THRU 580 C140	1	A
33A	150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 581 THRU 827 C140	1	A
33A	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF MCN 828 THRU 1286 SB20 C140	1	A
33A	150D475X0010 A2	2	CAPACITOR, FXD, 4.7 UF 20%, 10 VDCW 56289 184-7379-000 EFF MCN 1287 C140	1	A
33A	150D156X0020 B2	2	CAPACITOR, FXD, 15 UF 20%, 20 VDCW 56289 184-7371-000 EFF MCN 174 THRU 178 C140	1	B
33A	150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 179 THRU 354 C140	1	B
33A	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF MCN 355 THRU 714 SB20 C140	1	B
33A	150D475X0010 A2	2	CAPACITOR, FXD, 4.7 UF 20%, 10 VDCW 56289 184-7379-000 EFF MCN 715 C140	1	B
33A	150D475X0010 A2	2	CAPACITOR, FXD, 4.7 UF 20%, 10 VDCW 56289 184-7379-000 C140	1	C
34	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 553 ONLY SB20 R130	1	A
34	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 173 ONLY SB20 R130	1	B
35	600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF THRU MCN 1687 C81	1	A
35	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1688 C81	1	A
35	600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF THRU MCN 1084 C81	1	B
35	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1085 C81	1	B
35	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 C81	1	C

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1103 36	150D227X0010 S2	2	CAPACITOR, FXD, 220 UF 20%, 10 VDCW 56289 184-7419-000 EFF THRU MCN 1246	C60	1	A
36	600D227G007D D4	2	CAPACITOR, FXD, 220 UF P50M10%, 5 VDCW 56289 183-1277-070 EFF MCN 1247 THRU 1687	C60	1	A
36	150D337X0006 S2	2	CAPACITOR, FXD, 330 UF 20%, 6 VDCW 56289 184-7647-000 EFF MCN 1688	C60	1	A
36	150D227X0010 S2	2	CAPACITOR, FXD, 220 UF 20%, 10 VDCW 56289 184-7419-000 EFF THRU MCN 714	C60	1	B
36	600D227G007D D4	2	CAPACITOR, FXD, 220 UF P50M10%, 5 VDCW 56289 183-1277-070 EFF MCN 715 THRU 1084	C60	1	B
36	150D337X0006 S2	2	CAPACITOR, FXD, 330 UF 20%, 6 VDCW 56289 184-7647-000 EFF MCN 1085	C60	1	B
36	150D337X0006 S2	2	CAPACITOR, FXD, 330 UF 20%, 6 VDCW 56289 184-7647-000	C60	1	C
37	763F89	2	RESISTOR, THRM, 330 OHMS 10%, 1 W 10646 714-1714-000	RT3	1	
38	997F17	2	RESISTOR, THRM, 1000 OHMS 10%, 1/2 W 10646 714-1724-000 EFF THRU MCN 659 ONLY	RT4	1	A
38	997F17	2	RESISTOR, THRM, 1000 OHMS 10%, 1/2 W 10646 714-1724-000 EFF THRU MCN 220 ONLY	RT4	1	B
39	150D107X0010 R2	2	CAPACITOR, FXD, 100 UF 20%, 10 VDCW 56289 184-7651-000 EFF THRU MCN 553 SB20	C125	1	A
39	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 554 THRU 1246 SB20	C141	1	A
39	600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 1247 THRU 1687	C141	1	A
39	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1688	C141	1	A
39	150D107X0010 R2	2	CAPACITOR, FXD, 100 UF 20%, 10 VDCW 56289 184-7651-000 EFF THRU MCN 173 SB20	C125	1	B
39	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 174 THRU 714 SB20	C141	1	B
39	600D157G015D D4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 715 THRU 1084	C141	1	B
39	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1085	C141	1	B
39	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000	C141	1	C
40	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000		7	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		4	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		4	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		4	
41	549-4186-005	2	TERMINAL BOARD		1	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1103 42	G2619	3	TERMINAL 21242 306-0324-000 EFF MCN 1172	6	A
42	G2619	3	TERMINAL 21242 306-0324-000 EFF MCN 636	6	B
42	G2619	3	TERMINAL 21242 306-0324-000	6	C
43	05-3307-51	3	SOCKET 91662 352-9903-000 XQ12,XQ13 XQ15-XQ20	8	
	0004-7202S	3	RETAINER 91662 352-9904-000 AP	8	
44	G2621	3	TERMINAL 21242 306-1100-000	5	
44A	G2621	3	TERMINAL 21242 306-1100-000 EFF THRU MCN 553	1	A
44A	G2621	3	TERMINAL 21242 306-1100-000 EFF THRU MCN 173	1	B
44A	G2522	3	TERMINAL 12615 306-0323-000 EFF MCN 554 SB20	1	A
44A	G2522	3	TERMINAL 12615 306-0323-000 EFF MCN 174 SB20	1	B
44A	G2522	3	TERMINAL 12615 306-0323-000	1	C
44B	G2621	3	TERMINAL 21242 306-1100-000	1	
45	G2522	3	TERMINAL 12615 306-0323-000	14	
46	549-4185-005	3	TERMINAL BOARD	1	
1104 - 0	549-4190-005	1	AMPLIFIER, ELECTRONIC CONTROL SEE FIG. 1101-37 FOR NHA	REF	
1	2N174	2	TRANSISTOR 352-0127-000 Q30	1	
	P313-0056-000	2	NUT, PLAIN, HEX., NI PL BRS, 10-32 77250 313-0056-000 AP	1	
	1810-00	2	WASHER, LOCK, PH BRZ, 0.204 ID, 0.406 OD 78189 373-7040-000 AP	1	
	4021	2	TERMINAL 77147 304-8000-000 AP	1	
	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML AP	1	
	542-5313-002	2	INSULATOR, DISK AP	1	
	541-1244-003	2	WASHER AP	1	
	548-9549-003	2	WASHER AP	1	
2	150D476X0020R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 1358 C88	1	A
2	600D476G030KD4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 1359 THRU 1687 C88	1	A
2	600D157G015DD4	2	CAPACITOR, FXD, 150 UF P75M10%, 15 VDCW 56289 183-1277-130 EFF MCN 1688 C88	1	A
2	150D476X0020R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 761 C88	1	B
2	600D476G030KD4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 762 THRU 1083 C88	1	B
2	150D686X0020S2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7665-000 EFF MCN 1084 THRU 4699 C88	1	B
2	600D157G015DD4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 4700 C88	1	B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Electronic Control Amplifier
Figure 1104

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
	1104 2	600D157G015DD4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 C88	1	
	3	1N1775A	2	SEMICOND DEVICE 353-6012-000 CR11	1	
	4	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 R113	1	
	5	150D476X0020R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 1358 C71	1	A
	5	600D476G030KD4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 1359 THRU 1687 C71	1	A
	5	150D476X0020R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 761 C71	1	B
	5	600D476G030KD4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 762 THRU 1083 C71	1	B
	6	1N270	2	SEMICOND DEVICE 353-2018-000 CR6	1	
	6A	150D474X0035A2	2	CAPACITOR, FXD, 0.47 UF 20%, 35 VDCW 56289 184-7399-000 EFF MCN 838 THRU 851 C145	1	A
	6A	150D474X0035A2	2	CAPACITOR, FXD, 0.47 UF 20%, 35 VDCW 56289 184-7399-000 EFF MCN 317 THRU 344 C145	1	B
	7	1N270	2	SEMICOND DEVICE 353-2018-000 CR9	1	
R	8	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000 C70	1	
	9	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 R55	1	
	10	RC07GF471K	2	RESISTOR, FXD, 470 OHMS 10%, 1/4 W 745-0737-000 R54	1	
	11	150D157X0015S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF THRU MCN 1358 C112	1	A
R	11	600D157G015DD4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 1359	1	A
	11	150D157X0015S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF THRU MCN 727 C112	1	B
R	11	600D157G015DD4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 728	1	B
	11	600D157G015DD4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 C112	1	C
	12	RC20GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/2 W 745-1275-000 EFF THRU MCN 659 R63	1	A
	12	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 660 R63	1	A
	12	RC20GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/2 W 745-1275-000 EFF THRU MCN 220 R63	1	B
	12	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 221 R63	1	B
	12	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 R63	1	C
	12A	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 553 ONLY SB20 R139	1	A
	12A	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 173 ONLY SB20 R139	1	B

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1104 13	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 676	C122	1	A
13	151D114X0035 W2	2	CAPACITOR, FXD, 0.11 UF 20%, 35 VDCW 56289 184-8250-000 EFF MCN 677 THRU 1358 SB21	C122	1	A
13	192P10492	2	CAPACITOR, FXD, 0.1 UF 10%, 200 VDCW 56289 933-1039-050 EFF MCN 1359	C122	1	A
13	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 229	C122	1	B
13	151D114X0035 W2	2	CAPACITOR, FXD, 0.11 UF 20%, 35 VDCW 56289 184-8250-000 EFF MCN 230 THRU 761 SB21	C122	1	B
13	192P10492	2	CAPACITOR, FXD, 0.1 UF 10%, 200 VDCW 56289 933-1039-050 EFF MCN 762	C122	1	B
13	192P10492	2	CAPACITOR, FXD, 0.1 UF 10%, 200 VDCW 56289 933-1039-050	C122	1	D
14	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 1358	C73	1	A
14	600D476G030K D4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 1359 THRU 1687	C73	1	A
R 14	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF MCN 1688	C73	1	A
14	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 761	C73	1	B
14	600D476G030K D4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 762 THRU 1083	C73	1	B
14	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF MCN 1084	C73	1	B
14	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000	C73	1	C
14A	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF THRU MCN 553 ONLY SB20	R140	1	A
14A	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF THRU MCN 173 ONLY SB20	R140	1	B
15	RC07GF100K	2	RESISTOR, FXD, 10 OHMS 10%, 1/4 W 745-0677-000 EFF THRU MCN 553 SB20	R122	1	A
15	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 554 SB20	R122	1	A
15	RC07GF100K	2	RESISTOR, FXD, 10 OHMS 10%, 1/4 W 745-0677-000 EFF THRU MCN 173 SB20	R122	1	B
15	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 174 SB20	R122	1	B
15	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000	R122	1	C
15A	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	R123	1	
16	150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000	C114	1	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104 17	150D106X0020B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 1085 C113	1	
18		1	DELETED		
19	CL24BE600UP3	2	CAPACITOR, FXD, 60 UF P50M15%, 15 VDCW 184-7038-000 EFF THRU MCN 553 ONLY SB20 C99	1	A
19	CL24BE600UP3	2	CAPACITOR, FXD, 60 UF P50M15%, 15 VDCW 184-7038-000 EFF THRU MCN 173 ONLY SB20 C99	1	B
20	RW69V161	2	RESISTOR, FXD, 160 OHMS 5%, 3 W 747-5344-000 EFF THRU MCN 553 SB20 R119	1	A
20	150D226X0035R2	2	CAPACITOR, FXD, 22 UF 20%, 35 VDCW 56289 184-7695-000 EFF MCN 554 THRU 1358 C68	1	A
20	150D276X9020R2	2	CAPACITOR, FXD, 27 UF 10%, 20 VDCW 56289 184-9063-260 EFF MCN 1359 C68	1	A
20	RW69V161	2	RESISTOR, FXD, 160 OHMS 5%, 3 W 747-5344-000 EFF THRU MCN 173 SB20 R119	1	B
20	150D226X0035R2	2	CAPACITOR, FXD, 22 UF 20%, 35 VDCW 56289 184-7695-000 EFF MCN 728 C68	1	B
20	150D276X9020R2	2	CAPACITOR, FXD, 27 UF 10%, 20 VDCW 56289 184-9063-260 EFF MCN 174 THRU 727 SB20 C68	1	B
20	150D276X9020R2	2	CAPACITOR, FXD, 27 UF 10%, 20 VDCW 56289 184-9063-260 C68	1	C
21	RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF THRU MCN 659 R49	1	A
21	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 660 SB27 R49	1	A
21	RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF THRU MCN 220 R49	1	B
21	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 221 SB27 R49	1	B
21	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 R49	1	C
22	CL26BE400UN3	2	CAPACITOR, FXD, 40 UF P75M15%, 15 VDCW 184-7053-000 EFF THRU MCN 553 ONLY SB20 C68	1	A
22	CL26BE400UN3	2	CAPACITOR, FXD, 40 UF P75M15%, 15 VDCW 184-7053-000 EFF THRU MCN 173 ONLY SB20 C68	1	A
23	150D157X0015S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF THRU MCN 1358 C119	1	A
23	600D157G015DD4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 1359 THRU 1687 C119	1	A
23	150D157X0015S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1688 C119	1	A
23	150D157X0015S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF THRU MCN 727 C119	1	B
23	600D157G015DD4	2	CAPACITOR, FXD, 150 UF P50M10%, 15 VDCW 56289 183-1277-130 EFF MCN 728 THRU 1083 C119	1	B

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104 23	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 EFF MCN 1084 C119	1	B
23	150D157X0015 S2	2	CAPACITOR, FXD, 150 UF 20%, 15 VDCW 56289 184-7656-000 C119	1	C
24	RC20GF271K	2	RESISTOR, FXD, 270 OHMS 10%, 1/2 W 745-1328-000 EFF THRU MCN 659 R125	1	A
24	RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF MCN 660 SB27 R125	1	A
24	RC20GF271K	2	RESISTOR, FXD, 270 OHMS 10%, 1/2 W 745-1328-000 EFF THRU MCN 220 R125	1	B
24	RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF MCN 221 SB27 R125	1	B
24	RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 R125	1	C
25	RC32GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1 W 745-3331-000 EFF THRU MCN 106 R120	1	A
25	RC32GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1 W 745-3356-000 EFF MCN 107 THRU 553 ONLY SB20 R120	1	A
25	RW69V181	2	RESISTOR, FXD, 180 OHMS 5%, 3 W 745-5345-000 EFF THRU MCN 19 R120	1	B
25	RC32GF122K	2	RESISTOR, FXD, 1200 OHMS 10%, 1 W 745-3356-000 EFF MCN 20 THRU 173 ONLY SB20 R120	1	B
R 26	150D686X0015 R2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000 C9	1	A
R 26	150D686X0015 R2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000 EFF THRU MCN 4699 C9	1	B
26	150D686X0015 R2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000 EFF MCN 4700 C9	1	B
R 26	150D686X0015 R2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000 C9	1	C
R 27	RN65D18R7F	2	RESISTOR, FXD, 18.7 OHMS 1%, 1/2 W 705-7013-000 R50	1	
R 27	RN60D18R2F	2	RESISTOR, FXD, 18.2 OHMS 1%, 1/4 W 705-3603-120 R50	1	A
R 27	RN60D18R2F	2	RESISTOR, FXD, 18.2 OHMS 1%, 1/4 W 705-3603-120 R50	1	B,C
28	150D686X0020 S2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7665-000 EFF THRU MCN 212 C67	1	A
28	150D476X0035 S2	2	CAPACITOR, FXD, 47 UF 20%, 35 VDCW 56289 184-7411-000 EFF MCN 213 THRU 1358 SB17 C67	1	A
R 28	600D506G040D D4	2	CAPACITOR, FXD, 50 UF P75M10%, 40 VDCW 56289 183-1277-280 EFF MCN 1359 C67	1	A
28	150D476X0035 S2	2	CAPACITOR, FXD, 47 UF 20%, 3K VDCW 56289 184-7411-000 EFF THRU MCN 761 C67	1	B
28	600D506G040D D4	2	CAPACITOR, FXD, 50 UF P75M10%, 40 VDCW 56289 183-1277-280 EFF MCN 762 C67	1	B
R 28	600D506G040D D4	2	CAPACITOR, FXD, 50 UF P75M10%, 40 VDCW 56289 183-1277-280 C67	1	C
29	MS90540-07	2	COIL, RF, 2000 UH 240-2547-000 L24	1	
R 30	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000 C121	1	

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	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1104 31	RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R52	1	
R	32	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000	C120	1	
R	32A	RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000 EFF THRU MCN 5421 ONLY	R165	1	A
R	32A	RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000 EFF THRU MCN 9427 ONLY	R165	1	B,C
	33	RC07GF821K	2	RESISTOR, FXD, 820 OHMS 10%, 1/4 W 745-0746-000 EFF THRU MCN 659	R124	1	A
	33	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 EFF MCN 660 SB27	R124	1	A
	33	RC07GF821K	2	RESISTOR, FXD, 820 OHMS 10%, 1/4 W 745-0746-000 EFF THRU MCN 220	R124	1	B
	33	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 EFF MCN 221 SB27	R124	1	B
	33	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R124	1	C
	34	RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000	R115	1	
	34A	RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000 EFF MCN 107 THRU 553 ONLY SB20	R132	1	A
	34A	RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000 EFF THRU MCN 173 ONLY SB20	R132	1	B
	34B	CM05D331K03	2	CAPACITOR, FXD, 330 PF 10%, 500 VDCW 912-2853-000 EFF MCN 1159 THRU 3299	C150	1	A
	34B	D153F561K0	2	CAPACITOR, FXD, 560 PF 10%, 300 VDCW 00853 912-4124-010 EFF MCN 3300	C150	1	A
	34B	D155F331K03	2	CAPACITOR, FXD, 330 PF 10%, 500 VDCW 912-2853-000 EFF MCN 647 THRU 4726	C150	1	B
	34B	D153F561K0	2	CAPACITOR, FXD, 560 PF 10%, 300 VDCW 00853 912-4124-010 EFF MCN 4727	C150	1	B
	34B	D153F561K0	2	CAPACITOR, FXD, 560 PF 10%, 300 VDCW 00853 912-4124-010	C150	1	C
	35	CL26BJ2R5TN3	2	CAPACITOR, FXD, 2.5 UF 20%, 50 VDCW 184-7153-000 EFF THRU MCN 2921	C74	1	
R	35	CL23CJ1R5TN3	2	CAPACITOR, FXD, 1.5 UF P75M15%, 50 VDCW 184-7316-000 EFF MCN 2922 SB 31	C74	1	
	36	RC20GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/2 W 745-1275-000 EFF THRU MCN 659	R62	1	A
	36	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 660	R62	1	A
	36	RC20GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/2 W 745-1275-000 EFF THRU MCN 220	R62	1	B
	36	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 221	R62	1	B
	36	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000	R62	1	C

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1104 37	1N645	2	SEMICOND DEVICE 353-2607-000 EFF THRU MCN 553 ONLY SB20	CR14	1	A
37	1N645	2	SEMICOND DEVICE 353-2607-000 EFF THRU MCN 173 ONLY SB20	CR14	1	B
38	G2513	2	RESISTOR, VAR, 1000 OHMS 20%, 1/2 W 01121 380-1659-000	R131	1	
	P334-0266-000	2	NUT, PLAIN, HEX., NI PL BRS, 1/4-32 77250 334-0266-000 AP		1	
	1914-05-00-2480	2	WASHER, LOCK, PH BRZ, 0.267 ID, 0.408 OD 78189 373-0035-000 AP		1	
39	G1473	2	RESISTOR, VAR, 25,000 OHMS 20%, 1/2 W 01121 380-1651-000	R111	1	
	P334-0266-000	2	NUT, PLAIN, HEX., NI PL BRS, 1/4-32 77250 334-0266-000 AP		1	
	1914-05-00-2480	2	WASHER, LOCK, PH BRZ, 0.267 ID, 0.408 OD 78189 373-0035-000 AP		1	
40	RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 EFF THRU MCN 553 ONLY SB20	R101	1	A
40	RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 EFF THRU MCN 173 ONLY SB20	R101	1	B
41	EB51G5	2	RESISTOR, FXD, 5.1 OHMS 5%, 1/2 W 01121 745-1544-000 EFF THRU MCN 553 SB20	R77	1	A
41	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 554 SB20 AND SB27	R77	1	A
41	EB51G5	2	RESISTOR, FXD, 5.1 OHMS 5%, 1/2 W 01121 745-1544-000 EFF THRU MCN 173 SB20	R77	1	B
41	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 174 SB20 AND SB27	R77	1	B
41	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000	R77	1	C
R 42	CL26BJ2R5TN3	2	CAPACITOR, FXD, 2.5 UF 50 VDCW 184-0455-010 SB 33	C69	AR	
R 42	151D235X9050X2	2	CAPACITOR, FXD, 2.3 UF 10%, 50 VDCW 56289 184-9066-730 SB 33	C69	AR	
43	RC20GF330K	2	RESISTOR, FXD, 33 OHMS 10%, 1/2 W 745-1289-000 EFF THRU MCN 553 SB20	R74	1	A
43	RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF MCN 554 THRU 659 SB20	R74	1	A
43	RC07GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1/4 W 745-0731-000 EFF MCN 660 SB27	R74	1	A
43	RC20GF330K	2	RESISTOR, FXD, 33 OHMS 10%, 1/2 W 745-1289-000 EFF THRU MCN 173	R74	1	B
43	RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF MCN 174 THRU 220 SB20	R74	1	B
43	RC07GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1/4 W 745-0731-000 EFF MCN 221 SB27	R74	1	B
43	RC07GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1/4 W 745-0731-000	R74	1	C
44	EB51G5	2	RESISTOR, FXD, 5.1 OHMS 5%, 1/2 W 01121 745-1544-000 EFF THRU MCN 553 SB20	R76	1	A

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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104 44	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 554 SB20 AND SB27 R76	1	A
44	EB51G5	2	RESISTOR, FXD, 5.1 OHMS 5%, 1/2 W 01121 745-1544-000 EFF THRU MCN 173 SB20 R76	1	B
44	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 EFF MCN 174 SB20 AND SB27 R76	1	B
44	RC07GF150K	2	RESISTOR, FXD, 15 OHMS 10%, 1/4 W 745-0683-000 R76	1	C
44A	CM05D331K03	2	CAPACITOR, FXD, 330 PF 10%, 500 VDCW 912-2853-000 EFF MCN 925 SB29 C148	1	A
44A	CM05D331K03	2	CAPACITOR, FXD, 330 PF 10%, 500 VDCW 912-2853-000 EFF MCN 490 SB29 C148	1	B
44A	CM05D331K03	2	CAPACITOR, FXD, 330 PF 10%, 500 VDCW 912-2853-000 C148	1	C
45	RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 R157	1	
46	MS90541-04	2	COIL, RF, 5000 UH 240-2557-000 L15	1	
47	MS90541-04	2	COIL, RF, 5000 UH 240-2557-000 L12	1	
48	MS90541-04	2	COIL, RF, 5000 UH 240-2557-000 L13	1	
49	RC07GF151K	2	RESISTOR, FXD, 150 OHMS 10%, 1/4 W 745-0719-000 R61	1	
50	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 R59	1	
R 51	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-6201-000 C72	1	
52	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 R60	1	
53	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 R58	1	
54	RC07GF391K	2	RESISTOR, FXD, 390 OHMS 10%, 1/4 W 745-0734-000 R114	1	
55	RC07GF151K	2	RESISTOR, FXD, 150 OHMS 10%, 1/4 W 745-0719-000 R57	1	
56	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 R56	1	
56A	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 SB20 R133	AR	
56A	RC07GF182K	2	RESISTOR, FXD, 1800 OHMS 10%, 1/4 W 745-0758-000 SB20 R133	AR	
56A	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 SB20 R133	AR	
56A	RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000 SB20 R133	AR	
56A	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 SB20 R133	AR	
56A	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 SB20 R133	AR	
57	33C41	2	CAPACITOR, FXD, 0.1 UF P80M20%, 50 VDCW 56289 913-3886-000 C103	1	
58	RC20GF220K	2	RESISTOR, FXD, 22 OHMS 10%, 1/2 W 745-1282-000 R128	1	
59	MS90541-04	2	COIL, RF, 5000 UH 240-2557-000 L14	1	
60	4M17Z5	2	SEMICOND DEVICE 04713 353-3232-000 CR4	1	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104 61	150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 850 ONLY C123	1	A
61	150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 343 ONLY C123	1	B
62	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 1358 C116	1	A
62	600D476G030K D4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 1359 THRU 1687 C116	1	A
62	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF MCN 1688 C116	1	A
62	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF THRU MCN 761 C116	1	B
62	600D476G030K D4	2	CAPACITOR, FXD, 47 UF P75M10%, 30 VDCW 56289 183-1277-230 EFF MCN 762 THRU 1083 C116	1	B
62	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 EFF MCN 1084 C116	1	B
62	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 C116	1	C
63	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 R94	1	
64	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 R93	1	
64A	600D405F200K D4	2	CAPACITOR, FXD, 4 UF P75M10%, 200 VDCW 56289 183-2335-000 EFF MCN 851 SB25 C146	1	A
64A	600D405F200K D4	2	CAPACITOR, FXD, 4 UF P75M10%, 200 VDCW 56289 183-2335-000 EFF MCN 344 SB25 C146	1	B
64A	600D405F200K D4	2	CAPACITOR, FXD, 4 UF P75M10%, 200 VDCW 56289 183-2335-000 C146	1	C
65	1N1116	2	SEMICOND DEVICE 353-1611-000 CR7	1	
	1810-00	2	WASHER, LOCK, PH BRZ, 0.204 ID, 0.406 OD 78189 373-7040-000 AP	1	
	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML AP	1	
	4021	2	TERMINAL 77147 304-8000-000 AP	1	
66	RW69V8R2	2	RESISTOR, FXD, 8.2 OHMS 5%, 3 W 747-5318-000 R92	1	
67	CM07D203J03	2	CAPACITOR, FXD, 20,000 PF 5%, 500 VDCW 912-2747-000 EFF THRU MCN 1358 C104	1	A
67	55C30	2	CAPACITOR, FXD, 0.025 UF P80M20%, 500 VDCW 01939 913-3154-000 EFF MCN 1359 C104	1	A
67	CM07D203J03	2	CAPACITOR, FXD, 20,000 PF 5%, 500 VDCW 912-2747-000 EFF THRU MCN 761 C104	1	B
67	55C30	2	CAPACITOR, FXD, 0.025 UF P80M20%, 500 VDCW 01939 913-3154-000 EFF MCN 762 C104	1	B
67	55C30	2	CAPACITOR, FXD, 0.025 UF P80M20%, 500 VDCW 01939 913-3154-000 C104	1	C
68	RC20GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/2 W 745-1366-000 EFF THRU MCN 659 R75	1	A

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	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1104 68	RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 EFF MCN 660 SB27	R75	1	A
	68	RC20GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/2 W 745-1366-000 EFF THRU MCN 220	R75	1	B
	68	RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 EFF MCN 221 SB27	R75	1	B
	68	RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000	R75	1	C
	69	151D344X0035 W2	2	CAPACITOR, FXD, 0.34 UF 20%, 35 VDCW 56289 184-8263-000 SB20 AND SB21	C82	AR	
	69	151D504X0035 W2	2	CAPACITOR, FXD, 0.50 UF 20%, 35 VDCW 56289 184-8264-000 SB20 AND SB-21	C82	AR	
	69	151D754X0035 X2	2	CAPACITOR, FXD, 0.75 UF 20%, 35 VDCW 56289 184-8265-000 SB20 AND SB21	C82	AR	
	69	151D115X0035 X2	2	CAPACITOR, FXD, 1.1 UF 20%, 35 VDCW 56289 184-8266-000 EFF THRU MCN 1687 SB20 AND SB21	C82	AR	A
R	69	151D164X0035 W2	2	CAPACITOR, FXD, 0.16 UF 20%, 35 VDCW 56289 184-8261-000 EFF MCN 1688	C82	AR	A
	69	151D115X0035 X2	2	CAPACITOR, FXD, 1.1 UF 20%, 35 VDCW 56289 184-8266-000 EFF THRU MCN 1083	C82	AR	B
R	69	151D164X0035 W2	2	CAPACITOR, FXD, 0.16 UF 20%, 35 VDCW 56289 184-8261-000 EFF MCN 1084	C82	AR	B
R	69	151D164X0035 W2	2	CAPACITOR, FXD, 0.16 UF 20%, 35 VDCW 56289 184-8261-000	C82	AR	C
	70	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 659	Q24	1	A
	70	2N2405	2	TRANSISTOR 352-0479-000 EFF MCN 660 SB27	Q24	1	A
	70	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 220	Q24	1	B
	70	2N2405	2	TRANSISTOR 352-0479-000 EFF MCN 221 SB27	Q24	1	B
	70	2N2405	2	TRANSISTOR 352-0479-000	Q24	1	C
	71	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 659	Q25	1	A
	71	2N2405	2	TRANSISTOR 352-0479-000 EFF MCN 660 SB27	Q25	1	A
	71	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 220	Q25	1	B
	71	2N2405	2	TRANSISTOR 352-0479-000 EFF MCN 221 SB27	Q25	1	B
	71	2N2405	2	TRANSISTOR 352-0479-000	Q25	1	C
	72	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 659	Q29	1	A
	72	2N2405	2	TRANSISTOR 352-0479-000 EFF MCN 660 SB27	Q29	1	A
	72	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 220	Q29	1	B
	72	2N2405	2	TRANSISTOR 352-0479-000 EFF MCN 221 SB27	Q29	1	B
	72	2N2405	2	TRANSISTOR 352-0479-000	Q29	1	C

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FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1104 73	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 659	Q28	1	A
73	2N2405	2	TRANSISTOR 352-0479-000 EFF MCN 660 SB27	Q28	1	A
73	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 220	Q28	1	B
73	2N2405	2	TRANSISTOR 352-0479-000 EFF MCN 221 SB27	Q28	1	B
73	2N2405	2	TRANSISTOR 352-0479-000	Q28	1	C
74	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 659	Q22	1	A
74	2N1131	2	TRANSISTOR 352-0219-000 EFF MCN 660 SB27	Q22	1	A
74	2N158A	2	TRANSISTOR 14805 352-0041-000 EFF THRU MCN 220	Q22	1	B
74	2N1131	2	TRANSISTOR 352-0219-000 EFF MCN 221 SB27	Q22	1	B
74	2N1131	2	TRANSISTOR 352-0219-000	Q22	1	C
74A	1101A	2	MOUNTING 13103 352-9814-000 EFF MCN 660 THRU 1286 SB27		5	A
74A	1101	2	MOUNTING 13103 352-9813-000 EFF MCN 1287		5	A
74A	1101A	2	MOUNTING 13103 352-9814-000 EFF MCN 221 THRU 714 SB27		5	B
74A	1101	2	MOUNTING 13103 352-9813-000 EFF MCN 715		5	B
74A	1101	2	MOUNTING 13103 352-9813-000		5	C
	542-1348-002	2	SCREW, EXTERNALLY RELIEVED BODY EFF THRU MCN 659 AP FOR 70 THRU 74A		5	A
	P313-0056-000	2	NUT, PLAIN, HEX., NI PL BRS, 10-32 77250 313-0056-000 EFF MCN 660 SB27 AP FOR 70 THRU 74A		5	A
	761-0356-001	2	SLEEVE, SPACING EFF MCN 660 THRU 850 SB27 AP FOR 70 THRU 74A		5	A
	541-1243-003	2	WASHER EFF THRU MCN 659 AP FOR 70 THRU 74A		10	A
	IMC140	2	INSULATOR 10583 302-0410-000 EFF MCN 660 SB27 AP FOR 70 THRU 74A		10	A
	541-1245-003	2	WASHER EFF THRU MCN 659 AP FOR 70 THRU 74A		5	A
	548-9539-003	2	WASHER EFF MCN 660 SB27 AP FOR 70 THRU 74A		5	A
	548-9550-003	2	WASHER EFF THRU MCN 659 AP FOR 70 THRU 74A		5	A
	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML EFF MCN 660 THRU 673 AP FOR 70 THRU 74A		5	A
	310-0059-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.437 OD COML EFF MCN 674 SB27 AP FOR 70 THRU 74A		5	A
	542-1348-002	2	SCREW, EXTERNALLY RELIEVED BODY EFF THRU MCN 220 AP FOR 70 THRU 74A		5	B
	P313-0056-000	2	NUT, PLAIN, HEX., NI PL BRS, 10-32 77250 313-0056-000 EFF MCN 221 SB27 AP FOR 70 THRU 74A		5	B
	P313-0056-000	2	NUT, PLAIN, HEX., NI PL BRS, 10-32 77250 313-0056-000 AP FOR 70 THRU 74A		5	C

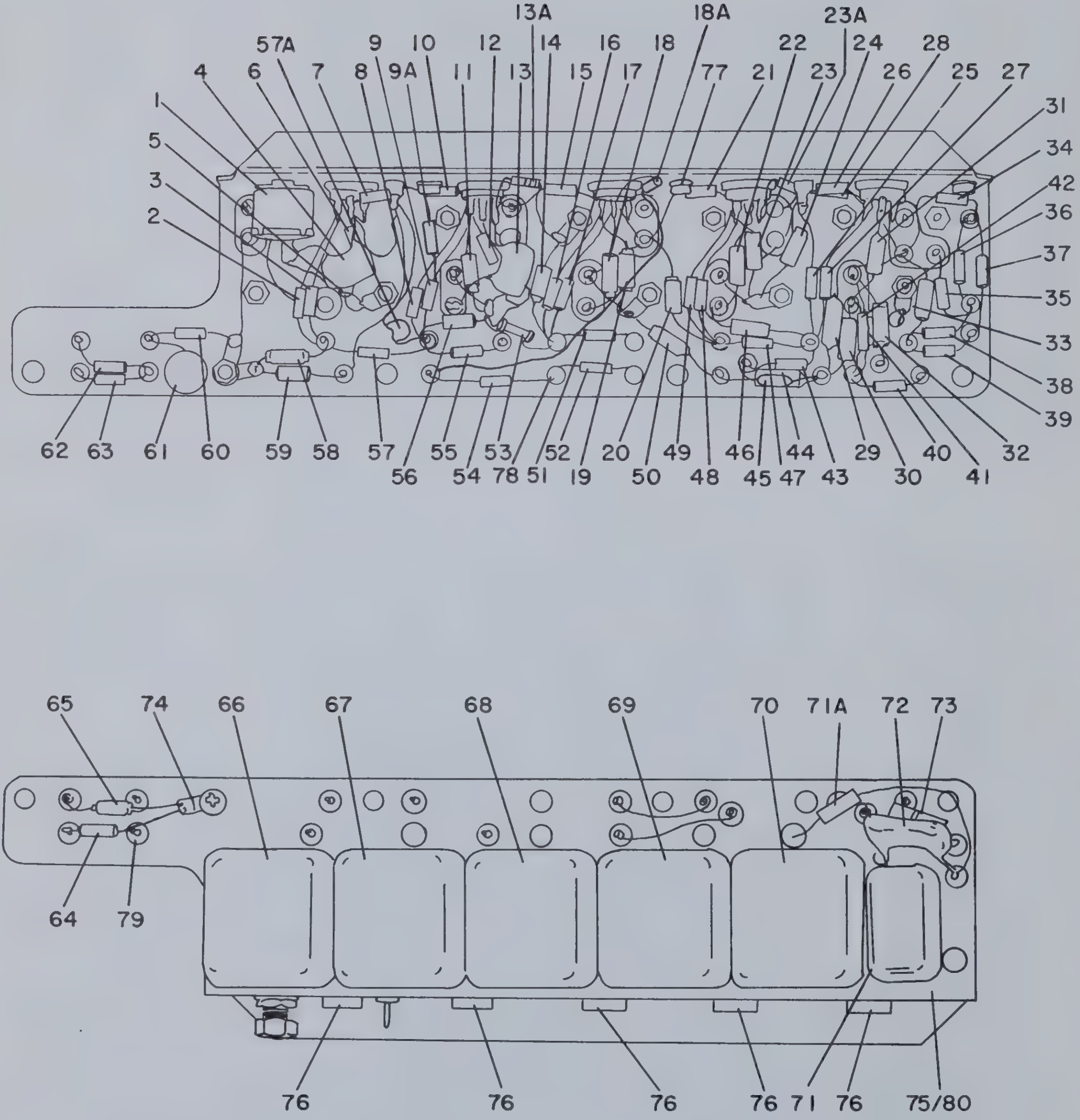
GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1104	761-0356-001	2	SLEEVE, SPACING EFF MCN 221 THRU 343 SB27 AP FOR 70 THRU 74A	5	B
	541-1243-003	2	WASHER EFF THRU MCN 220 AP FOR 70 THRU 74A	10	B
	IMC140	2	INSULATOR 10583 302-0410-000 EFF MCN 221 SB27 AP FOR 70 THRU 74A	10	B
	IMC140	2	INSULATOR 10583 302-0410-000 AP FOR 70 THRU 74A	10	C
	541-1245-003	2	WASHER EFF THRU MCN 220 AP FOR 70 THRU 74A	5	B
	548-9539-003	2	WASHER EFF MCN 221 SB27 AP FOR 70 THRU 74A	5	B
	548-9539-003	2	WASHER AP FOR 70 THRU 74A	5	C
	548-9550-003	2	WASHER EFF THRU MCN 220 AP FOR 70 THRU 74A	5	B
	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML EFF MCN 221 THRU 239 AP FOR 70 THRU 74A	5	B
	310-0059-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.437 OD COML EFF MCN 240 SB27 AP FOR 70 THRU 74A	5	B
	310-0059-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.437 OD COML AP FOR 70 THRU 74A	5	C
75	A12598	2	TRANSFORMER 70674 677-9013-000 T18	1	
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	1	
76	A12591	2	TRANSFORMER 70674 677-9016-000 T19	1	
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP	1	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	1	
	506-5906-003	2	WASHER AP	2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	2	
77	2N174	2	TRANSISTOR 352-0127-000 Q23	1	
	P313-0056-00 0	2	NUT, PLAIN, HEX., NI PL BRS, 10-32 77250 313-0056-000 AP	1	
	1810-00	2	WASHER, LOCK, PH BRZ, 0.204 ID, 0.406 OD 78189 373-7040-000 AP	1	
	4021	2	TERMINAL 77147 304-8000-000 AP	1	
	310-0060-000	2	WASHER, FLAT, NI PL BRS, 0.203 ID, 0.500 OD COML AP	1	
	542-5313-002	2	INSULATOR, DISK AP	1	
	541-1244-003	2	WASHER AP	1	
	548-9549-003	2	WASHER AP	1	
77A	150D476X0020 R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000 C151	AR	
77A	150D686X0015 R2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000 C151	AR	
77A	CS13BD566K	2	CAPACITOR, FXD, 56 UF 10%, 15 VDCW 184-6161-000 C151	AR	
77A	150D107X0010 R2	2	CAPACITOR, FXD, 100 UF 20%, 10 VDCW 56289 184-7651-000 C151	AR	

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1104 77B	150D476X0020R2	2	CAPACITOR, FXD, 47 UF 20%, 20 VDCW 56289 184-7664-000	C153	AR	
77B	150D686X0015R2	2	CAPACITOR, FXD, 68 UF 20%, 20 VDCW 56289 184-7655-000	C153	AR	
77B	CS13BD566K	2	CAPACITOR, FXD, 56 UF 10%, 15 VDCW 184-6161-000	C153	AR	
77B	150D107X0010R2	2	CAPACITOR, FXD, 100 UF 20%, 10 VDCW 56289 184-7651-000	C153	AR	
78	BC3178	2	TRANSFORMER 97315 673-0826-000 EFF THRU MCN 1358	Z2	1	A
78	A16634	2	REACTOR 70674 668-0081-010 EFF MCN 1359	L32	1	A
78	BC3178	2	TRANSFORMER 97315 673-0826-000 EFF THRU MCN 761	Z2	1	B
78	A16634	2	REACTOR 70674 668-0081-010 EFF MCN 762	L32	1	B
78	A16634	2	REACTOR 70674 668-0081-010	L32	1	C
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 EFF THRU MCN 1212 AP		3	A
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 EFF THRU MCN 727 AP		3	B
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 EFF MCN 1213 AP		3	A
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 EFF MCN 728 AP		3	B
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		3	C
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 EFF MCN 1213 AP		4	A
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 EFF MCN 728 AP		4	B
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		4	C
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 EFF MCN 1213 AP		4	A
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 EFF MCN 728 AP		4	B
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000		4	C
79	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000		15	
	MS51957-12	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/16 343-0132-000 AP		4	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP		4	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		6	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		6	
80	549-4180-004	2	CHASSIS, ELECTRICAL EQUIP.		1	
81	05-3307-51	3	SOCKET 91662 352-9903-000	XQ26,XQ27 XQ31	3	
	0004-7202S	3	RETAINER 91662 352-9904-000 AP		3	
82	F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000		4	

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1104 83	G2621	3	TERMINAL 21242 306-1100-000		22	
83A	G2621	3	TERMINAL 21242 306-1100-000 EFF MCN 660 SB27		1	A
83A	G2621	3	TERMINAL 21242 306-1100-000 EFF MCN 221 SB27		1	B
83A	G2621	3	TERMINAL 21242 306-1100-000		1	C
83B	G2621	3	TERMINAL 21242 306-1100-000 EFF MCN 1213		1	A
83B	G2621	3	TERMINAL 21242 306-1100-000 EFF MCN 728		1	B
83B	G2621	3	TERMINAL 21242 306-1100-000		1	C
84	G2619	3	TERMINAL 21242 306-0324-000		10	
84A	G2619	3	TERMINAL 21242 306-0324-000 EFF MCN 660 SB27		2	A
84A	G2619	3	TERMINAL 21242 306-0324-000 EFF MCN 221 SB27		2	B
84A	G2619	3	TERMINAL 21242 306-0324-000		2	C
85	G2522	3	TERMINAL 12615 306-0323-000		14	
86	549-4193-005	3	CHASSIS, ELECTRICAL EQUIP.		1	
1105 - 0	549-4188-005	1	AMPLIFIER, IF SEE FIG. 1101-48 FOR NHA		REF	A
1105 - 0	549-4188-006	1	AMPLIFIER, IF SEE FIG. 1101-48 FOR NHA		REF	B,C
1	BC23130	2	RESISTOR, VAR, 250 OHMS 20%, 1/2 W 71450 380-1671-000	R90	1	
	P334-0266-000	2	NUT, PLAIN, HEX., NI PL BRS, 1/4-32 77250 334-0266-000 AP		1	
	1914-05-00-2480	2	WASHER, LOCK, PH BRZ, 0.267 ID, 0.408 OD 78189 373-0035-000 AP		1	
2	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	R23	1	
3	RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF MCN 2266	R22	1	A
3	RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF MCN 2033	R22	1	B
3	RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000	R22	1	C
4	DM15F511J300W4CR	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000 EFF THRU MCN 686	C110	1	A
4	150D103X0035A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 687 THRU 1207 SB23	C110	1	A
4	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1208	C110	1	A
4	DM15F511J300W4CR	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000 EFF THRU MCN 233	C110	1	B
4	150D103X0035A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 234 THRU 692 SB23	C110	1	B
4	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693	C110	1	B

GROUP ASSEMBLY PARTS LIST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IF Amplifier
Figure 1105

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM		PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1105	4	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C110	1	C
	5	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF THRU MCN 1687	C47	1	A
	5	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688	C47	1	A
	5	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF THRU MCN 1084	C47	1	B
	5	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	C47	1	B
	5	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C47	1	C
	6	RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R106	1	
	7	RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000	R24	1	
	8	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	R28	1	
	9	RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000	R27	1	
	9A	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 1688	R146	1	A
	9A	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 1085	R146	1	B
	9A	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R146	1	C
	10	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF THRU MCN 1687	R26	1	A
	10	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 1688	R26	1	A
	10	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF THRU MCN 1084	R26	1	B
	10	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 1085	R26	1	B
	10	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R26	1	C
	11	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF THRU MCN 1687	C50	1	A
	11	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF 1688	C50	1	A
	11	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF THRU MCN 1084	C50	1	B
	11	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	C50	1	B
	11	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C50	1	C
	12	RC07GF822K	2	RESISTOR, FXD, 8200 OHMS 10%, 1/4 W 745-0782-000	R107	1	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1105 13	DM15F511J300W4CR	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000 EFF THRU MCN 106 C48	1	
13	150D103X0035A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 107 THRU 1207 C48	1	A
13	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1208 C48	1	A
13	150D103X0035A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF THRU MCN 692 C48	1	B
13	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693 C48	1	B
13	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 C48	1	C
R 13A	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 SB 30 R166	1	
R 14	CS13BF105M5	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-6201-000 C66	1	
15	RC07GF273K	2	RESISTOR, FXD, 27,000 OHMS 10%, 1/4 W 745-0800-000 R108	1	
16	RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 R109	1	A
17	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 R110	1	
18	150D104X0035A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 1687 C51	1	A
18	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688 C51	1	A
18	150D104X0035A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 1084 C51	1	B
18	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085 C51	1	B
18	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 C51	1	C
R 18A	RC07GF124K	2	RESISTOR, FXD, 0.12 MEG 10%, 1/4 W 745-0824-000 EFF MCN 3925 R169	1	A
R 18A	RC07GF124K	2	RESISTOR, FXD, 0.12 MEGO 10%, 1/4 W 745-0824-000 EFF MCN 9075 R169	1	B,C
19	150D105X0035A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1687 C109	1	A
19	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688 C109	1	A
19	150D105X0035A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1084 C109	1	B
19	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085 C109	1	B
19	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 C109	1	C

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1105 20	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000 C107	1	
21	RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF THRU MCN 1687 R29	1	A
21	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF MCN 1688 R29	1	A
21	RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF THRU MCN 1084 R29	1	B
21	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF MCN 1085 R29	1	B
21	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 R29	1	C
22	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 686 C108	1	A
22	150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 687 THRU 1207 C108	1	A
22	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1208 C108	1	A
22	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 233 C108	1	B
22	150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 234 THRU 692 SB23 C108	1	B
22	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693 C108	1	B
22	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 C108	1	C
23	150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 686 C52	1	A
23	150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 687 THRU 1207 SB23 C52	1	A
23	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1208 THRU 1687 C52	1	A
23	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 1688 C52	1	A
23	150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 233 C52	1	B
23	150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF MCN 234 THRU 692 SB23 C52	1	B
23	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693 THRU 1084 C52	1	B
23	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 1085 C52	1	B
23	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 C52	1	C

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
R 1105 23A	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 SB 30	R167	1	
24	150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1687	C54	1	A
24	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688	C54	1	A
24	150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1084	C54	1	B
24	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	C54	1	B
24	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C54	1	C
25	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R35	1	
26	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF THRU MCN 3299	R34	1	A
26	RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000 EFF MCN 3300	R34	1	A
26	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF THRU MCN 4726	R34	1	B
26	RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000 EFF MCN 4727	R34	1	B
26	RC07GF561K	2	RESISTOR, FXD, 560 OHMS 10%, 1/4 W 745-0740-000	R34	1	C
27	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000	R33	1	
28	RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000	R32	1	
29	RN60D5621F	2	RESISTOR, FXD, 5620 OHMS 1%, 1/4 W 705-6632-000	R42	1	
30	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000	C58	1	
31	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 1687	C53	1	A
31	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688	C53	1	A
31	150D104X0035 A2	1	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF THRU MCN 1084	C53	1	B
31	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085	C53	1	B
31	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C53	1	C
32	150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF THRU MCN 1207	C127	1	A
32	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1208	C127	1	A
32	150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF THRU MCN 692	C127	1	B

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1105 32	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693 C127	1	B
32	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 C127	1	C
33	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 C57	1	
34	RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 R39	1	
35	1N270	2	SEMICOND DEVICE 353-2018-000 CR1	1	
36	RC07GF273K	2	RESISTOR, FXD, 27,000 OHMS 10%, 1/4 W 745-0800-000 R38	1	
37	1N270	2	SEMICOND DEVICE 353-2018-000 CR2	1	
38	RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000 R36	1	
39	RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000 R37	1	
40	RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000 EFF THRU MCN 2131 R40	1	A
40	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF MCN 2132 R40	1	A
40	RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000 EFF THRU MCN 1806 R40	1	B
40	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF MCN 1807 R40	1	B
40	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 R40	1	C
41	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 C117	1	
42	1N270	2	SEMICOND DEVICE 353-2018-000 CR10	1	
43	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 R104	1	
44	RN60D4222F	2	RESISTOR, FXD, 42,200 OHMS 1%, 1/4 W 705-6674-000 R41	1	
45	1N270	2	SEMICOND DEVICE 353-2018-000 CR3	1	
R 46	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000 C55	1	
47	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 R103	1	
48	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 R30	1	
49	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 R31	1	
50	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 C59	1	
51	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF THRU MCN 1687 R102	1	A
51	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF MCN 1688 R102	1	A
51	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF THRU MCN 1083 R102	1	B
51	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF MCN 1084 R102	1	B
51	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 R102	1	C

GROUP ASSEMBLY PARTS LIST

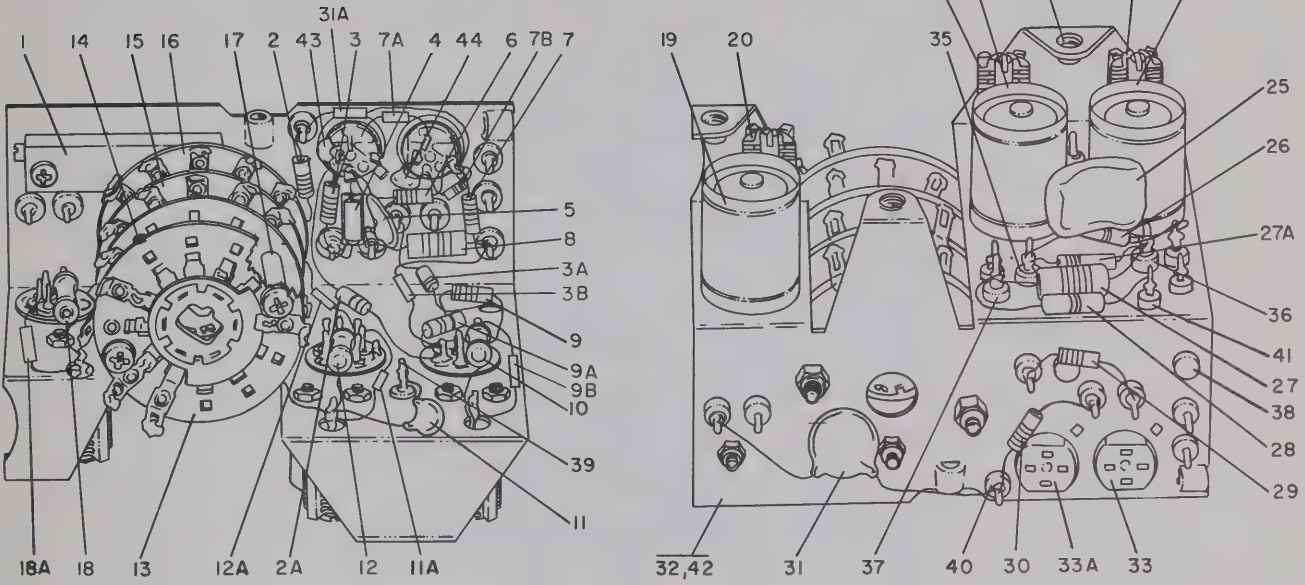
FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1105 52	RC07GF124K	2	RESISTOR, FXD, 0.12 MEG 10%, 1/4 W 745-0824-000 R116	1	
53	997F17	2	RESISTOR, THRM, 1000 OHMS 10%, 1/2 W 10646 714-1724-000 EFF THRU MCN 1687 RT5	1	A
53	763F28	2	RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000 EFF MCN 1688 RT5	1	A
53	997F17	2	RESISTOR, THRM, 1000 OHMS 10%, 1/2 W 10646 714-1724-000 EFF THRU MCN 1083 RT5	1	B
53	763F28	2	RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000 EFF MCN 1084 RT5	1	B
53	763F28	2	RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000 RT5	1	C
54	1N270	2	SEMICOND DEVICE 353-2018-000 CR5	1	
55	RC07GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1/4 W 745-0731-000 EFF THRU MCN 1687 R100	1	A
55	RC07GF121K	2	RESISTOR, FXD, 120 OHMS 10%, 1/4 W 745-0716-000 EFF MCN 1688 R100	1	A
55	RC07GF331K	2	RESISTOR, FXD, 330 OHMS 10%, 1/4 W 745-0731-000 EFF THRU MCN 1084 R100	1	B
55	RC07GF121K	2	RESISTOR, FXD, 120 OHMS 10%, 1/4 W 745-0716-000 EFF MCN 1085 R100	1	B
55	RC07GF121K	2	RESISTOR, FXD, 120 OHMS 10%, 1/4 W 745-0716-000 R100	1	C
R 56	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-6201-000 C49	1	
57	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 1687 R25	1	A
57	RC07GF101K	2	RESISTOR, FXD, 100 OHMS 10%, 1/4 W 745-0713-000 EFF MCN 1688 R25	1	A
57	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 1084 R25	1	B
57	RC07GF101K	2	RESISTOR, FXD, 100 OHMS 10%, 1/4 W 745-0713-000 EFF MCN 1085 R25	1	B
57	RC07GF101K	2	RESISTOR, FXD, 100 OHMS 10%, 1/4 W 745-0713-000 R25	1	C
R 57A	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-6201-000 EFF MCN 1688 C158	1	A
R 57A	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-6201-000 EFF MCN 1085 C158	1	B
R 57A	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-6201-000 C158	1	C
58	150D105X0035A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1687 C46	1	A
58	150D106X0020B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 1688 C46	1	A
58	150D105X0035A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 1084 C46	1	B
58	150D106X0020B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 1085 C46	1	B
58	150D106X0020B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 C46	1	C
59	150D225X0020A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 C61	1	

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1105 60	RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF THRU MCN 1687 R118	1	A
60	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 EFF MCN 1688 R118	1	A
60	RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF THRU MCN 1083 R118	1	B
60	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 EFF MCN 1084 R118	1	B
60	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000 R118	1	C
61	416H17	2	RESISTOR, THRM, 10,000 OHMS 10%, 0.7 W 10646 714-1566-000 EFF THRU MCN 1687 RT1	1	A
61	763F28	2	RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000 EFF MCN 1688 RT1	1	A
61	416H17	2	RESISTOR, THRM, 10,000 OHMS 10%, 0.7 W 10646 714-1566-000 EFF THRU MCN 1083 RT1	1	B
61	763F28	2	RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000 EFF MCN 1084 RT1	1	B
61	763F28	2	RESISTOR, THRM, 10,000 OHMS 10%, 1 W 10646 714-0182-000 RT1	1	C
62	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 R126	1	
63	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 R127	1	
R 64	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-6201-000 C115	1	
R 65	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-6201-000 C124	1	
66	X489-2	2	TRANSFORMER 81815 278-0711-000 T13	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	1	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
67	X489-2	2	TRANSFORMER 81815 278-0711-000 T14	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	1	
68	X489-2	2	TRANSFORMER 81815 278-0711-000 T15	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	2	
69	X489-2	2	TRANSFORMER 81815 278-0711-000 T16	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	1	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1105 70	X489-2	2	TRANSFORMER 81815 278-0711-000 T17	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	1	
71	X487-2	2	TRANSFORMER 81815 278-0712-000 Z1	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	2	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	2	
	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 AP	1	
71A	CM05D361J03	2	CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000 EFF MCN 1688 C157	1	A
71A	CM05D361J03	2	CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000 EFF MCN 1085 C157	1	B
71A	CM05D361J03	2	CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000 C157	1	C
72	DM20F152J500 WV	2	CAPACITOR, FXD, 1500 PF 5%, 500 VDCW 72136 912-3327-000 C56	1	
73	MS90539-15	2	COIL, RF, 1000 UH 240-2540-000 L22	1	
74	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000	3	
	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 AP	1	
	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	1	
	P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	1	
75	549-4184-005	2	TERMINAL BOARD	1	
76	05-3307-01	3	SOCKET 91662 352-9902-000 XQ7-XQ11	5	
	0004-7202S	3	RETAINER 91662 352-9904-000 AP	5	
77	F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000	3	
78	G2621	3	TERMINAL 21242 306-1100-000	10	
79	G2522	3	TERMINAL 12615 306-0323-000	17	
80	549-4183-005	3	TERMINAL BOARD	1	
1106 - 0	548-7678-005	1	AMPLIFIER, RF SEE FIG. 1101-60	REF	B,C
1106 - 0	554-5566-005	1	AMPLIFIER, RF SEE FIG. 1101-60 FOR NHA	REF	A
1	224L1-202	2	RESISTOR, VAR, 2000 OHMS 5%, 1/2 W 80294 381-1266-000 R136	1	
	MS35649-24	2	NUT, PLAIN, HEX., SST, 2-56 313-0037-000 AP	2	
	MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP	2	
	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP	2	
2	RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF THRU MCN 1687 R135	1	A

GROUP ASSEMBLY PARTS LIST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RF Amplifier
Figure 1106

	FIG. - ITEM		PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1106	2	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF MCN 1688	R135	1	A
		2	RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF THRU MCN 1084	R135	1	B
		2	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF MCN 1085	R135	1	B
		2	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000	R135	1	C
		2A	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF MCN 1845	R147	1	A
		3	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R13	1	
		3A	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF MCN 1845	R148	1	A
R		3A	1537-48	2	COIL, RF, 27 UH 99800 240-2502-000 EFF THRU MCN 12917	L35	1	B,C
R		3A	RN60D3830F	2	RESISTOR, FXD, 383 OHMS 1%, 1/4 W 705-6576-000 EFF MCN 12918	R183	1	B,C
R		3B	1537-48	2	COIL, RF, 27 UH 99800 240-2502-000 EFF THRU MCN 12917	L36	1	B,C
R		3B	RN60D3830F	2	RESISTOR, FXD, 383 OHMS 1%, 1/4 W 705-6576-000 EFF MCN 12918	R182	1	B,C

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
R	1106 4	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-6201-000	C118	1	
	5	805-014X5V01 03Z	2	CAPACITOR, FXD, 0.01 UF P80M20%, 100 VDCW 72982 913-3680-000 EFF THRU MCN 938	C133	1	A
	5	151D113X0035 W2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-8255-000 EFF MCN 939 THRU 1204	C133	1	A
	5	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1205	C133	1	A
	5	805-014X5V01 03Z	2	CAPACITOR, FXD, 0.01 UF P80M20%, 100 VDCW 72982 913-3680-000 EFF THRU MCN 324	C133	1	B
	5	151D113X0035 W2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-8255-000 EFF MCN 325 THRU 692	C133	1	B
	5	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693 THRU 4726	C133	1	B
R	5	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 4727	C133	1	B
R	5	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF THRU MCN 4726	C133	1	C
R	5	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 4727	C133	1	C
	6	RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000	R105	1	
	7	RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000	R137	1	A
	7A	RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000 EFF MCN 1845	R149	1	A
	7B	RC07GF682K	2	RESISTOR, FXD, 6800 OHMS 10%, 1/4 W 745-0779-000	R137	1	B,C
	8	LT4K041	2	COIL, RF, 3.9 UH 240-0144-000	L31	1	A
R	8	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF THRU MCN 4726	C163	1	B,C
R	8	150D104X0035 A2	2	CAPACITOR, FXD, 0.10 UF 20%, 35 VDCW 56289 184-7408-000 EFF MCN 4727	C163	1	B,C
	9	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF THRU MCN 1687 ONLY	R143	1	A
R	9	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF MCN 5422	R143	1	A
R	9A	RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF MCN 1494 THRU 4726	R152	1	B
R	9A	RC07GF680K	2	RESISTOR, FXD, 68 OHMS 10%, 1/4 W 745-0707-000 EFF THRU MCN 4726	R152	1	C
R	9B	CC20CH050D	2	CAPACITOR, FXD, 5 PF 1/2 PF, 500 VDCW 916-0118-000 EFF THRU MCN 4792	C167	1	A
R	9B	CC20UJ030P	2	CAPACITOR, FXD, 3 PF 1/2 PF, 500 VDCW 916-0385-000 EFF MCN 4793	C167	1	A
R	10	301-000R3A0-240J	2	CAPACITOR, FXD, 24 PF 5%, 500 VDCW 72982 913-4614-000 EFF THRU MCN 4017	C100	1	A

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
R	1106 10	CC20UJ240G	2	CAPACITOR, FXD, 24 PF 20%, 500 VDCW 916-0435-000 EFF MCN 4018	C100	1	A
	11	CM05D271J03	2	CAPACITOR, FXD, 270 PF 5%, 500 VDCW 912-2846-000	C138	1	B,C
R	11A	CC20CH050D	2	CAPACITOR, FXD, 5 PF 1/2 PF, 500 VDCW 916-0118-000 EFF THRU MCN 4792	C168	1	A
R	11A	CC20UJ030P	2	CAPACITOR, FXD, 3 PF 1/2 PF, 500 VDCW 916-0385-000 EFF MCN 4793	C168	1	A
	12	CC20UJ240G	2	CAPACITOR, FXD, 24 PF 2%, 500 VDCW 916-0435-000	C101	1	A
R	12A	CM05C120K03	2	CAPACITOR, FXD, 12 PF 10%, 500 VDCW 912-2757-000 EFF THRU MCN 4726 ONLY	C165	1	B,C
	13	235431F	2	SWITCH SECTION 76854 269-2515-000	S1A	1	A
	13	232667F	2	SWITCH SECTION 76854 269-2475-000	S1R	1	B,C
	14	235432F	2	SWITCH SECTION 76854 269-2516-000	S1B	1	A
	14	232666F	2	SWITCH SECTION 76854 269-2463-000	S1N	1	B,C
	15	232666F	2	SWITCH SECTION 76854 269-2463-000	S1N	1	A
	15	232067F	2	SWITCH SECTION 76854 269-2461-000	S10	1	B,C
	16	235401F	2	SWITCH SECTION 76854 269-2517-000	S1C	1	
	17	541-5970-002	2	SPACER, SLV		8	
		P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP FOR 13 THRU 17		2	
		8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP FOR 13 THRU 17		2	
		347-0315-000	2	SCREW, MACH., CAD. PL STL, FIL H, 4-40 X 2 COML AP FOR 13 THRU 17		2	
		310-0278-000	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP FOR 13 THRU 17		2	
	18	CC20UJ240G	2	CAPACITOR, FXD, 24 PF 2%, 500 VDCW 916-0435-000	C102	1	A
	18	CC20CH050D	2	CAPACITOR, FXD, 5 PF 1/2 PF, 500 VDCW 916-0118-000 EFF MCN 2099	C102	1	B
	18	CC20CH050D	2	CAPACITOR, FXD, 5 PF 1/2 PF, 500 VDCW 916-0118-000	C102	1	C
R	18A	CC20CH050D	2	CAPACITOR, FXD, 5 PF 1/2 PF, 500 VDCW 916-0118-000 EFF THRU MCN 4792	C169	1	A
R	18A	CC20UJ030P	2	CAPACITOR, FXD, 3 PF 1/2 PF, 500 VDCW 916-0385-000 EFF MCN 4793	C169	1	A
	19	X891	2	TRANSFORMER 81815 278-1858-000	T6	1	A
R	19	X855	2	TRANSFORMER 81815 278-1842-000	T106	1	B,C
	20	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	C18	1	
		P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP		2	
		545-7529-003	2	WASHER AP		2	
		P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP		2	
	21	X892	2	TRANSFORMER 81815 278-1859-000	T5	1	A

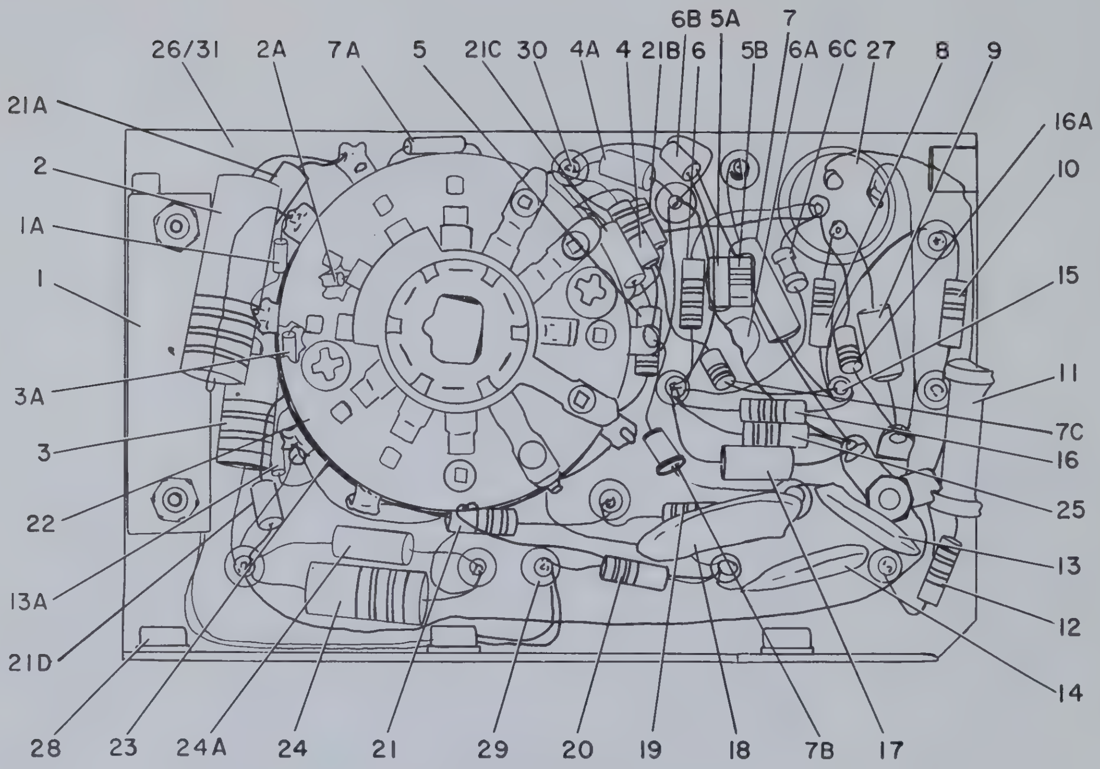
GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
R	1106 21	X855	2	TRANSFORMER 81815 278-1842-000	T105	1	B,C
	22	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	C17	1	
	23	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	C16	1	
		P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP FOR 22 AND 23		4	
		545-7529-003	2	WASHER AP FOR 22 AND 23		4	
		P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP FOR 22 AND 23		4	
	24	X893	2	TRANSFORMER 81815 278-1860-000	T4	1	A
	24	X854	2	TRANSFORMER 81815 278-1844-000	T104	1	B,C
	25	CM06D302F03	2	CAPACITOR, FXD, 3000 PF 5%, 500 VDCW 912-3037-000	C119	1	A
	25	LT4K048	2	COIL, RF, 15 UH 240-0151-000	L30	1	B,C
	26	MS90538-09	2	COIL, RF, 75 UH 240-2513-000	L28	1	B,C
	27	LT4K044	2	COIL, RF, 6.8 UH 240-0147-000	L2	1	A
R	27A	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 11900	R170	1	B,C
		MS90538-17	2	COIL, RF, 160 UH 240-2521-000	L27	1	B,C
	28	MS90538-01	2	COIL, RF, 36 UH 240-2505-000	L29	1	B,C
	29	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	R117	1	
	30	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 EFF THRU MCN 1980	R14	1	A
	30	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 1981	R14	1	A
	30	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R14	1	B,C
	31	855-502X5V0203Z	2	CAPACITOR, FXD, 0.022 UF P80M20Z, 100 VDCW 72982 913-3678-000 EFF THRU MCN 873	C137	1	A
	31	150D223X0035A2	2	CAPACITOR, FXD, 0.022 UF 20%, 35 VDCW 56289 184-7673-000 EFF MCN 874 THRU 1305	C137	1	A
	31	150D223X0035A2	2	CAPACITOR, FXD, 0.022 UF 20%, 35 VDCW 56289 184-7673-000 EFF MCN 1845	C137	1	A
	31	150D223X0035A2	2	CAPACITOR, FXD, 0.022 UF 20%, 35 VDCW 56289 184-7673-000	C137	1	
R	31	855-502X5V0203Z	2	CAPACITOR, FXD, 0.02 UF P80M20%, 100 VDCW 72982 913-3678-000 EFF THRU MCN 316 THRU 4726	C137	1	B
	31	150D223X0035A2	2	CAPACITOR, FXD, 0.022 UF 20%, 35 VDCW 56289 184-7673-000 EFF MCN 317	C137	1	B
R	31A	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 4727	C137	1	B
		192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C137	1	B,C
	32	554-5564-003	2	SHIELD, AMPL		1	A
	32	548-7673-003	2	SHIELD, AMPL		1	B,C
	33	05-3307-01	3	SOCKET 91662 352-9902-000	XQ2	1	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1106 33A	05-3307-01	3	SOCKET 91662 352-9902-000 EFF THRU MCN 1687 XQ4	1	A
33A	05-3307-51	3	SOCKET 91662 352-9903-000 EFF MCN 1688 XQ4	1	A
33A	05-3307-01	3	SOCKET 91662 352-9902-000 EFF THRU MCN 1083 XQ4	1	B
33A	05-3307-51	3	SOCKET 91662 352-9903-000 EFF MCN 1084	1	B
33A	05-3307-51	3	SOCKET 352-9903-000 XQ4	1	C
	0004-7202S	3	RETAINER 91662 352-9904-000 AP FOR 33 AND 33A	2	
34	F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000	3	
35	G2621	3	TERMINAL 21242 306-1100-000	2	
36	G2621	3	TERMINAL 21242 306-1100-000	1	A
36	G2522	3	TERMINAL 12615 306-0323-000	1	B,C
37	G2621	3	TERMINAL 21242 306-1100-000	1	B,C
38	G2619	3	TERMINAL 21242 306-0324-000	3	
39	G2522	3	TERMINAL 12615 306-0323-000	1	A
39	G2619	3	TERMINAL 21242 306-0324-000	1	B,C
40	G2522	3	TERMINAL 12615 306-0323-000	8	
41	G2522	3	TERMINAL 12615 306-0323-000	3	B,C
42	548-7676-004	3	SHIELD, AMPL	1	
43	GA7-7UUFPORM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000 EFF MCN 1688 C154	1	A
43	GA7-7UUFPORM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000 EFF MCN 1085 C154	1	B
43	GA7-7UUFPORM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000 C154	1	C
44	GA7-7UUFPORM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000 EFF MCN 1688 C155	1	A
44	GA7-7UUFPORM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000 EFF MCN 1085 C155	1	B
44	GA7-7UUFPORM 5PCT	2	CAPACITOR, FXD, 4.7 PF 5%, 500 VDCW 78488 913-2993-000 C155	1	C
1107 - 0	549-4175-004	1	MODULATOR, BALANCED SEE FIG. 1101-61 FOR NHA	REF	A
R 1107 - 0	548-7764-004	1	MODULATOR, BALANCED SEE FIG. 1101-61 FOR NHA	REF	B,C
1	224L1-502	2	RESISTOR, VAR, 5000 OHMS 5%, 1/2 W 80294 381-1287-000 R10	1	
	MS35649-24	2	NUT, PLAIN, HEX., SST, 2-56 313-0037-000 AP	2	
	MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP	2	
	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP	2	
1A	D155C120K0	2	CAPACITOR, FXD, 10 PF 10%, 500 VDCW 912-2757-000 EFF MCN 209 THRU 553 C130	1	A

GROUP ASSEMBLY PARTS LIST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Balanced Modulator
Figure 1107

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R 1107 1A	CM06D681J03	2	CAPACITOR, FXD, 680 PF 5%, 500 VDCW 912-2989-000 EFF MCN 554 THRU 5421 C130	1	A
R 1A	CM06FD152J03	2	CAPACITOR, FXD, 1500 PF 5%, 500 VDCW 912-3013-000 EFF MCN 5422 C130	1	A
2	MS90541-11	2	COIL, RF, 10,000 UH 240-2564-000 EFF THRU MCN 553 L1	1	A
R 2	MS90540-07	2	COIL, RF, 2000 UH 240-2547-000 EFF MCN 554 THRU 5422 L1	1	A
2	MS90540-07	2	COIL, RF, 2000 UH 240-2547-000 EFF THRU MCN 3052 L1	1	B
2A	RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF MCN 209 THRU 553 R134	1	A
2A	RC07GF471K	2	RESISTOR, FXD, 470 OHMS 10%, 1/4 W 745-0737-000 EFF MCN 554 THRU 580 ONLY R134	1	A
3	MS90540-07	2	COIL, RF, 2000 UH 240-2547-000 EFF THRU MCN 553 L6	1	A
3	MS90539-15	2	COIL, RF, 1000 UH 240-2540-000 EFF MCN 554 THRU 580 ONLY L6	1	A

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1107 3	MS90539-15	2	COIL, RF, 1000 UH 240-2540-000 EFF THRU MCN 1083	L6	1	B
	3	MS90539-08	2	COIL, RF, 500 UH 240-2533-000 EFF MCN 1084 THRU 3052	L6	1	B
	3	CM06D561J03	2	CAPACITOR, FXD, 560 PF 5%, 500 VDCW 912-2983-000 EFF MCN 3053	C162	1	B
	3	CM06D561J03	2	CAPACITOR, FXD, 560 PF 5%, 500 VDCW 912-2983-000	C162	1	C
R	3A	RC07GF681K	2	RESISTOR, FXD, 680 OHMS 10%, 1/4 W 745-0743-000 EFF MCN 554 THRU 5421 ONLY	R138	1	A
	4	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 SB20	R8	1	
R	4	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 5167	R8	1	A
R	4A	150D105X0035 A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF MCN 925 THRU 5421 ONLY SB28	C149	1	A
	4A	RC07GF153K	2	RESISTOR, FXD, 15,000 OHMS 10%, 1/4 W 745-0791-000 EFF THRU MCN 173	R134	1	B
	4A	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 174 THRU 1083 SB20	R134	1	B
	4A	RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000 EFF MCN 1084 THRU 3052	R134	1	B
	5	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 SB20	R64	1	
R	5	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 5167	R64	1	A
R	5A	150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 5422	C176	1	A
R	5A	150D106X0020 B2	2	CAPACITOR, FXD, 10 UF 20%, 20 VDCW 56289 184-7375-000 EFF MCN 7243	C176	1	B,C
R	5B	RC07GF101K	2	RESISTOR, FXD, 100 OHMS 10%, 1/4 W 745-0713-000 EFF MCN 5422	R168	1	A
R	5B	RC07GF101K	2	RESISTOR, FXD, 100 OHMS 10%, 1/4 W 745-0713-000 EFF MCN 7243	R168	1	B,C
R	6	RC07GF391K	2	RESISTOR, FXD, 390 OHMS 10%, 1/4 W 745-0734-000 EFF THRU MCN 5421 ONLY	R5	1	A
R	6	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF MCN 5422	R7	1	A
	6	RC07GF391K	2	RESISTOR, FXD, 390 OHMS 10%, 1/4 W 745-0734-000 EFF THRU MCN 3052	R5	1	B
R	6A	D155C100K0	2	CAPACITOR, FXD, 10 PF 10%, 500 VDCW 912-2754-000 EFF THRU MCN 173	C130	1	B
	6A	CM05D271J03	2	CAPACITOR, FXD, 270 PF 5%, 500 VDCW 912-2846-000 EFF MCN 174 THRU 3052	C130	1	B
R	6B	65-136	2	TRANSFORMER 81815 278-2097-010 EFF MCN 5422	T21	1	A

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
R	1107 6B	65-136	2	TRANSFORMER 06978 278-2097-010 EFF MCN 3053	T21	1	B,C
	6C	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 3053	C159	1	B
	6C	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C159	1	C
R	7	RN60D3160F	2	RESISTOR, FXD, 316 OHMS 1%, 1/4 W 705-6572-000 EFF THRU MCN 5421	R7	1	A
R	7	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF MCN 5422	R7	1	A
	7	RN60D3160F	2	RESISTOR, FXD, 316 OHMS 1%, 1/4 W 705-6572-000 EFF THRU MCN 3052	R7	1	B
	7A	RC07GF562K	2	RESISTOR, FXD, 5600 OHMS 10%, 1/4 W 745-0776-000 EFF MCN 1494 THRU 3052	R150	1	B
	7B	RC07GF182K	2	RESISTOR, FXD, 1800 OHMS 10%, 1/4 W 745-0758-000 EFF MCN 1494 THRU 3052	R151	1	B
R	7C	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 2564 THRU 5421 ONLY	R97	1	A
	7C	RC07GF332K	2	RESISTOR, FXD, 3300 OHMS 10%, 1/4 W 745-0767-000 EFF MCN 1548 THRU 3052	R153	1	B
R	8	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF THRU MCN 5421	R95	1	A
R	8	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF MCN 5422	R95	1	A
	8	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF THRU MCN 3052	R95	1	B
	8	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF MCN 3053	R95	1	B
	8	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000	R95	1	C
R	9	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000 EFF THRU MCN 5421	C15	1	A
R	9	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 5422	C15	1	A
	9	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000 EFF THRU MCN 3052	C15	1	B
	10	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 745-0725-000 EFF THRU MCN 924	R6	1	A
	10	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF MCN 925 THRU 1687 SB28	R6	1	A
R	10	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000 EFF MCN 1688 THRU 5421	R6	1	A
R	10	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF MCN 5422	R6	1	A
	10	RC07GF221K	2	RESISTOR, FXD, 220 OHMS 10%, 1/4 W 745-0725-000 EFF THRU MCN 3052	R6	1	B
R	11	763F93	2	RESISTOR, THRM, 100 OHMS 10%, 1 W 10646 714-1730-000 EFF THRU MCN 5421	RT2	1	A

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1107 11	763F93	2	RESISTOR, THRM, 100 OHMS 10%, 1 W 10646 714-1730-000 EFF THRU MCN 3052	RT2	1	B
12	RC07GF152K	2	RESISTOR, FXD, 1500 OHMS 10%, 1/4 W 745-0755-000	R91	1	
R 13	55C32A2	2	CAPACITOR, FXD, 10,000 PF P50M20%, 400 VDCW 01939 913-3731-000 EFF THRU MCN 5421	C11	1	A
R 13	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 5422	C11	1	A
13	55C32A2	2	CAPACITOR, FXD, 10,000 PF P50M20%, 400 VDCW 01939 913-3731-000 EFF THRU MCN 3052	C11	1	B
13	192P10392	2	CAPACITOR, FXD, 0.01UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 3053	C11	1	B
13	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C11	1	C
R 13A	CM05D391J03	2	CAPACITOR, FXD, 390 PF 5%, 500 VDCW 912-2858-000 EFF THRU MCN 5166 ONLY	C139	1	A
R 14	55C32A2	2	CAPACITOR, FXD, 10,000 PF P50M20%, 400 VDCW 01939 913-3731-000 EFF THRU MCN 5421	C12	1	A
R 14	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 5422	C12	1	A
14	55C32A2	2	CAPACITOR, FXD, 10,000 PF P50M20%, 400 VDCW 01939 913-3731-000 EFF THRU MCN 3052	C12	1	B
14	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 3053	C12	1	B
14	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C12	1	C
R 15	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF THRU MCN 5421	R98	1	A
R 15	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 5422	R98	1	A
15	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000 EFF THRU MCN 3052	R98	1	B
15	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4W 745-0785-000 EFF MCN 3053	R98	1	B
15	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R98	1	C
R 16	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 5421	R4	1	A
R 16	RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000 EFF MCN 5167	R4	1	A
R 16	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 5422	R4	1	B
16A	RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000 EFF MCN 3053	R4	1	B
16A	RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000	R4	1	C

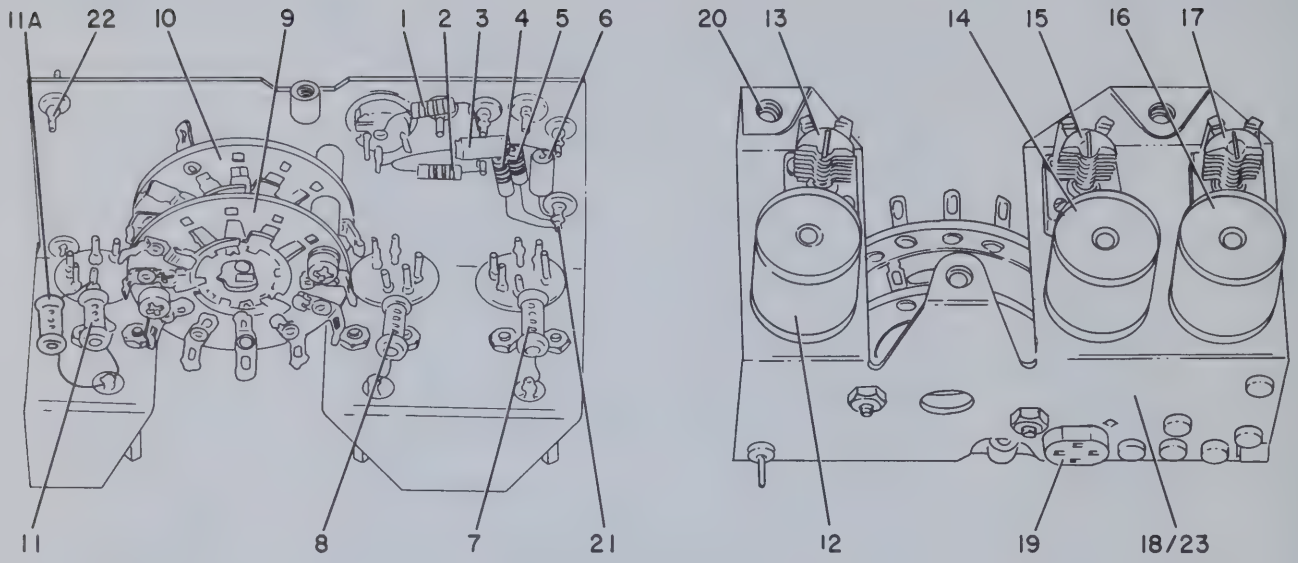
GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
R	1107 17	CS13BF105M	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 184-6201-000 EFF THRU MCN 5421 ONLY	C14	1	A
	17	150D105X0035A2	2	CAPACITOR, FXD, 1 UF 20%, 35 VDCW 56289 184-7398-000 EFF THRU MCN 3052	C14	1	B
R	18	33C2	2	CAPACITOR, FXD, 0.02 UF P100M20%, 500 VDCW 01939 913-2142-000 EFF THRU MCN 5421	C13	1	A
R	18	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 5422	C13	1	A
	18	33C2	2	CAPACITOR, FXD, 0.02 UF P100M20%, 500 VDCW 01939 913-2142-000 EFF THRU MCN 3052	C13	1	B
	18	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 3053	C13	1	B
	18	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C13	1	C
	19	1N270	2	SEMICOND DEVICE 353-2018-000	CR15	1	
	20	1N270	2	SEMICOND DEVICE 353-2018-000	CR16	1	
	21	RC07GF182K	2	RESISTOR, FXD, 1800 OHMS 10%, 1/4 W 745-0758-000	R9	1	
	21A	CM05C180K03	2	CAPACITOR, FXD, 18 PF 10%, 500 VDCW 912-2763-000 EFF MCN 581 THRU 2235	C142	1	A
R	21A	RC07GF563K	2	RESISTOR, FXD, 56,000 OHMS 10%, 1/4 W 745-0812-000 EFF MCN 2236 THRU 5421 ONLY	R154	1	A
R	21B	RC07GF392K	2	RESISTOR, FXD, 3900 OHMS 10%, 1/4 W 745-0770-000 EFF MCN 581 THRU 5421 ONLY	R144	1	A
R	21C	CM05D101J03	2	CAPACITOR, FXD, 100 PF 5%, 500 VDCW 912-2816-000 EFF MCN 581 THRU 5421 ONLY	C143	1	A
	21D	CM05D470J03	2	CAPACITOR, FXD, 47 PF 5%, 500 VDCW 912-2792-000 EFF MCN 581 THRU 631	C144	1	A
R	21D	CM05D820J03	2	CAPACITOR, FXD, 82 PF 5%, 500 VDCW 912-2810-000 EFF MCN 632 THRU 5421 ONLY	C144	1	A
	21D	CM06D392J03	2	CAPACITOR, FXD, 3900 PF 5%, 500 VDCW 912-3046-000 EFF MCN 3053	C161	1	B
	21D	CM06D392J03	2	CAPACITOR, FXD, 3900 PF 5%, 500 VDCW 912-3046-000	C161	1	C
	22	235437F	2	SWITCH SECTION 76854 269-2523-000 EFF THRU MCN 553	S1D	1	A
R	22	237946F	2	SWITCH SECTION 76854 269-2554-000 EFF MCN 554 THRU 5421 SB20	S1D	1	A
R	22	268451F	2	SWITCH SECTION 76854 269-2627-080 EFF MCN 5167	S1E	1	B,C
R	22	235433F	2	SWITCH SECTION 76854 269-2518-000	S1E	1	B,C
		P347-0013-000	2	SCREW, MACH., SST, FIL H, 4-40 X 7/8 77250 347-0013-000 AP		2	
		541-5966-002	2	SPACER, SLV AP		4	
		8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP		2	

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1107	P313-0132-00 O	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		2	
		310-0278-000	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP		2	
R	23	268451F	2	SWITCH 76854 269-2627-080 EFF MCN 5422	S1E	1	A
R	23	235437F	2	SWITCH SECTION 76854 269-2523-000	SIE	1	B,C
	24	MS90539-15	2	COIL, RF, 1000 UH 240-2540-000 EFF THRU MCN 580	L17	1	A
R	24	MS90539-08	2	COIL, RF, 500 UH 240-2533-000 EFF MCN 581 THRU 5421	L17	1	A
	24	MS90539-15	2	COIL, RF, 1000 UH 240-2540-000 EFF THRU MCN 173	L17	1	B
	24	MS90539-08	2	COIL, RF, 500 UH 240-2533-000 EFF MCN 174 THRU 3052 SB20	L17	1	B
	24A	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 554 THRU 580 SB20	R141	1	A
R	24A	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000 EFF MCN 581 THRU 5421 ONLY	R141	1	A
	24A	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 174 THRU 3052 SB20	R141	1	B
	24A	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 3053	C160	1	B
	24A	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C160	1	C
R	25	SPL4040-2HOT TINNED	2	TERMINAL 77147 304-0331-000		2	
		MS35649-24	2	NUT, PLAIN, HEX., SST, 2-56 313-0037-000 AP		1	
		MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP		1	
		MS51957-3	2	SCREW, MACH., SST, PAN HD, 2-56 X 1/4 343-0124-000 AP		1	
	26	549-4148-003	2	SHIELD, MODULATOR		1	A
	26	549-4148-004	2	SHIELD, MODULATOR		1	B,C
	27	05-3307-01	3	SOCKET 91662 352-9902-000	XQ3	1	
		0004-7202S	3	RETAINER 91662 352-9904-000 AP		1	
	28	F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000		3	
	29	G2621	3	TERMINAL 21242 306-1100-000		13	
	30	G2522	3	TERMINAL 12615 306-0323-000		1	
	31	549-4168-004	3	SHIELD, MODULATOR		1	

GROUP ASSEMBLY PARTS LIST



RF Amplifier
Figure 1108

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1108 - 0	549-4174-004	1	AMPLIFIER, RF SEE FIG. 1101-62 FOR NHA		REF	A
1108 - 0	549-4174-005	1	AMPLIFIER, RF SEE FIG. 1101-62 FOR NHA		REF	B,C
1	RC07GF472K	2	RESISTOR, FXD, 4700 OHMS 10%, 1/4 W 745-0773-000 EFF THRU MCN 2563	R97	1	A
2	RC07GF272K	2	RESISTOR, FXD, 2700 OHMS 10%, 1/4 W 745-0764-000	R3	1	A
2	RC07GF182K	2	RESISTOR, FXD, 1800 OHMS 10%, 1/4 W 745-0758-000	R3	1	B,C
3	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000	C6	1	
4	RC07GF102K	2	RESISTOR, FXD, 1000 OHMS 10%, 1/4 W 745-0749-000	R2	1	
5	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R1	1	
6	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%, 20 VDCW 56289 184-7377-000	C5	1	
7	CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000 EFF THRU MCN 106	C97	1	A

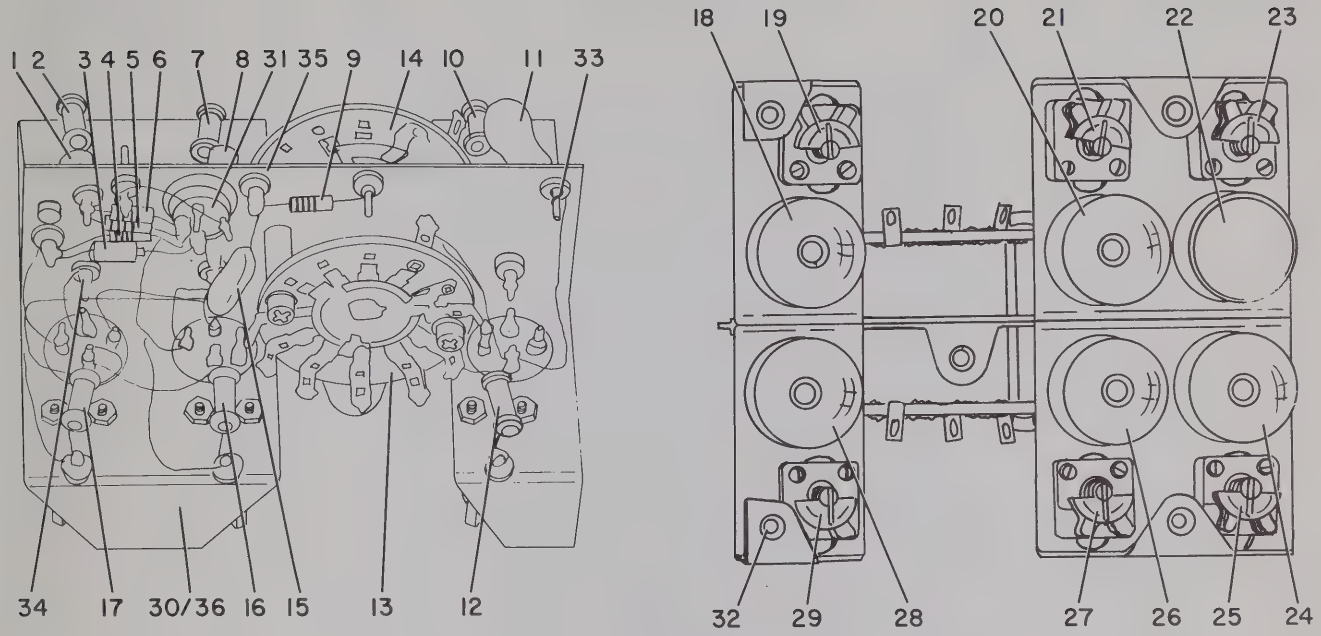
GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1108 7	CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF MCN 107 THRU 1356	C97	1	A
	7	301N3300-85D EGC20PFPORM2 5PCT	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-1097-010 EFF MCN 1357 THRU 2131	C97	1	A
	7	301-000R3A0-240J	2	CAPACITOR, FXD, 24 PF 5%, 500 VDCW 72982 913-4614-000 EFF MCN 2132 THRU 2298	C97	1	A
R	7	301N3300-85D EGC20PFPORM2 5PCT	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-1097-010 EFF MCN 2299	C97	AR	A
R	7	301N4200-85C 15PFPORM5PCT	2	CAPACITOR, FXD, 15 PF, 500 VDCW 72982 913-1097-130	C97	AR	A
	7	CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF MCN 107 THRU 759	C97	1	B
	7	301N3300-85D EGC20PFPORM2 5PCT	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-1097-010 EFF MCN 760 THRU 1866	C97	1	B
	7	301-000R3A0-240J	2	CAPACITOR, FXD, 24 PF 5%, 500 VDCW 72982 913-4614-000 EFF MCN 1867 THRU 2268	C97	1	B
R	7	301N3300-85D EGC20PFPORM2 5PCT	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-1097-010 EFF MCN 2269	C97	AR	B
R	7	301N4200-85C 15FPORM5PCT	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 72982 913-1097-130	C97	AR	B
R	7	301N3300-85D EGC20PFPORM2 5PCT	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-1097-010	C97	AR	C
R	7	301N4200-85C 15PFPORM5PCT	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 72982 913-1097-130	C97	AR	C
	8	CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000 EFF THRU MCN 1356	C98	1	A
	8	301-000R3K0-200J	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-4616-000 EFF MCN 1357 THRU 2676	C98	1	A
	8	301-000R3A0-200J	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-4615-000 EFF MCN 2677	C98	1	A
	8	CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000 EFF THRU MCN 759	C98	1	B
	8	301-000R3K0-200J	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-4616-000 EFF MCN 760 THRU 3132	C98	1	B
	8	301-000R3A0-200J	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-4615-000 EFF MCN 3133	C98	1	B
	8	301-000R3A0-200J	2	CAPACITOR, FXD, 20 PF 5%, 500 VDCW 72982 913-4615-000	C98	1	C
	9	235434F	2	SWITCH SECTION 76854 269-2519-000	S1F	1	
		P347-0015-000	2	SCREW, MACH., SST, FIL H, 4-40 X 1-1/8 77250 347-0015-000 AP		2	
		541-5970-002	2	SPACER, SLV AP		4	
		8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP		2	
		P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP		2	
		310-0278-000	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP		2	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1108 10	235436F	2	SWITCH SECTION 76854 269-2521-000 S1G	1	
11	CC20CH050C	2	CAPACITOR, FXD, 5 PF 1/4 PF, 500 VDCW 916-0117-000 EFF THRU MCN 1356 C126	1	A
11	301N4200-85DEGC5PFPORM-25PF	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-1097-020 EFF MCN 1357 C126	1	A
11	CC20CH050C	2	CAPACITOR, FXD, 5 PF 1/4 PF, 500 VDCW 916-0117-000 EFF THRU MCN 759 C126	1	B
11	301N4200-85DEGC5PFPORM-25PF	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-1097-020 EFF MCN 760 C126	1	B
11	301N4200-85DEGC5PFPORM-25PF	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-1097-020 C126	1	C
11A	CC20CH120K	2	CAPACITOR, FXD, 12 PF 10%, 500 VDCW 916-0142-000 C166	1	
12	X275-2	2	TRANSFORMER 81815 278-0731-000 T3	1	
13	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C4	1	
	P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
	545-7529-003	2	WASHER AP	2	
	P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
14	X274-3	2	TRANSFORMER 81815 278-0710-000 T2	1	
15	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C3	1	
	P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
	545-7529-003	2	WASHER AP	2	
	P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
16	X273-3	2	TRANSFORMER 81815 278-0732-000 T1	1	
17	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C2	1	
	P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
	545-7529-003	2	WASHER AP	2	
	P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
18	549-4147-003	2	SHIELD, AMPL	2	
19	05-3307-01	3	SOCKET 91662 352-9902-000 XQ1	1	
	0004-7202S	3	RETAINER 91662 352-9904-000 AP	1	
20	F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000	3	
21	G2619	3	TERMINAL 21242 306-0324-000	6	
22	G2522	3	TERMINAL 12615 306-0323-000	1	
23	549-4166-004	3	SHIELD, AMPL	1	

GROUP ASSEMBLY PARTS LIST



Frequency Mixer Stage
Figure 1109

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1109 - 0	548-7677-005	1	MIXER STAGE, FREQ SEE FIG. 1101-63 FOR NHA	REF	
1	4422-9-36	2	COIL, RF, 27 UH 82142 240-0169-000 EFF THRU MCN 339 L7	1	A
1	4422-11-117	2	COIL, RF, 39 UH 82142 240-0171-000 EFF MCN 340 THRU 1289 L7	1	A
1	CM06D392J03	2	CAPACITOR, FXD, 3900 PF 5%, 500 VDCW 912-3046-000 EFF MCN 1290 THRU 1687 C152	1	A
1	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1688 C152	1	A
1	4422-9-36	2	COIL, RF, 27 UH 82142 240-0169-000 EFF THRU MCN 346 L7	1	B
1	4422-11-117	2	COIL, RF, 39 UH 82142 240-0171-000 EFF MCN 347 THRU 717 L7	1	B
1	CM06F392J03	2	CAPACITOR, FXD, 3900 PF 5%, 500 VDCW 912-3046-000 EFF MCN 718 THRU 1084 C152	1	B

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1109 1	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1085 C152	1	B
1	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 C152	1	C
2	CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000 C90	1	
3	150D225X0020 A2	2	CAPACITOR, FXD, 2.2 UF 20%,20 VDCW 56289 184-7377-000 C33	1	
4	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 1687 R21	1	A
4	RC07GF393K	2	RESISTOR, FXD, 39,000 OHMS 10%, 1/4 W 745-0806-000 EFF MCN 1688 R21	1	A
4	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF THRU MCN 1084 R21	1	B
4	RC07GF393K	2	RESISTOR, FXD, 39,000 OHMS 10%, 1/4 W 745-0806-000 EFF MCN 1085 R21	1	B
4	RC07GF393K	2	RESISTOR, FXD, 39,000 OHMS 10%, 1/4 W 745-0806-000 R21	1	C
R 5	RC07GF184K	2	RESISTOR, FXD, 0.18 MEG 10%, 1/4 W 745-0830-000 EFF THRU MCN 1687 R16	1	A
5	RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF MCN 1688 R16	1	A
5	RC07GF184K	2	RESISTOR, FXD, 0.18 MEG 10%, 1/4 W 745-0830-000 EFF THRU MCN 1084 R16	1	B
5	RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 EFF MCN 1085 R16	1	B
5	RC07GF223K	2	RESISTOR, FXD, 22,000 OHMS 10%, 1/4 W 745-0797-000 R16	1	C
R 6	RC07GF393K	2	RESISTOR, FXD, 39,000 OHMS 10%, 1/4 W 745-0806-000 EFF THRU MCN 1687 R15	1	A
6	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 1688 R15	1	A
6	RC07GF393K	2	RESISTOR, FXD, 39,000 OHMS 10%, 1/4 W 745-0806-000 EFF THRU MCN 1084 R15	1	B
6	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 EFF MCN 1085 R15	1	B
6	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000 R15	1	C
7	CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000 C91	1	
8	LT4K043	2	COIL, RF, 5.6 UH 240-0146-000 EFF THRU MCN 339 L8	1	A
8	LT4K046	2	COIL, RF, 10 UH 240-0149-000 EFF MCN 340 L8	1	A
8	LT4K043	2	COIL, RF, 5.6 UH 240-0146-000 EFF THRU MCN 846 L8	1	B
8	LT4K046	2	COIL, RF, 10 UH 240-0149-000 EFF MCN 847 L8	1	B
8	LT4K046	2	COIL, RF, 10 UH 240-0149-000 L8	1	C
9	RC07GF123K	2	RESISTOR, FXD, 12,000 OHMS 10%, 1/4 W 745-0788-000 R17	1	
10	CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000 C92	1	
11	DM20F822J100 WV	2	CAPACITOR, FXD, 8200 PF 5%, 100 VDCW 72136 912-3758-000 C96	1	

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1109 12	CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF THRU MCN 581	C95	1	A
R	12	CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000 EFF MCN 582 THRU 1687	C95	1	A
R	12	CC20CH150J	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 916-0671-000 EFF MCN 1688	C95	1	A
	12	CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF THRU MCN 1084	C95	1	B
R	12	CC20CH150J	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 916-0671-000 EFF MCN 1085	C95	1	B
R	12	CC20CH150J	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 916-0671-000	C95	1	C
	13	235438F	2	SWITCH SECTION 76854 269-2524-000	S1I	1	
R		313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 COML AP		2	
		8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP		6	
R		541-5968-002	2	SPACER, SLV AP		2	
	14	232068F	2	SWITCH SECTION 76854 269-2462-000	S1P	1	
R		P347-0015-000	2	SCREW, MACH., SST, FIL HD, 4-40 X 1-1/8 77250 347-0015-000 AP		2	
R		8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP		4	
R		541-5968-002	2	SPACER, SLV AP		2	
	15	DM15F511J300W4CR	2	CAPACITOR, FXD, 510 PF 5%, 500 VDCW 72136 912-2867-000	C29	1	
	16	CC20CH180J	2	CAPACITOR, FXD, 18 PF 5%, 500 VDCW 916-0674-000	C94	1	
	17	CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000 EFF THRU MCN 339	C93	1	A
	17	CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF MCN 340 THRU 1687	C93	1	A
	17	CC20CH150J	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 916-0671-000 EFF MCN 1688	C93	1	A
	17	CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000 EFF THRU MCN 846	C93	1	B
	17	CC20CH150G	2	CAPACITOR, FXD, 15 PF 2%, 500 VDCW 916-0670-000 EFF MCN 847 THRU 1084	C93	1	B
	17	CC20CH150J	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 916-0671-000 EFF MCN 1085	C93	1	B
	17	CC20CH150J	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 916-0671-000	C93	1	C
	18	X853	2	TRANSFORMER 81815 278-1840-000	T109	1	A
	18	X853	2	TRANSFORMER 81815 278-1840-000	T109	1	B,C
	19	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000	C25	1	
		P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP		2	
		545-7529-003	2	WASHER AP		2	
		P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP		2	

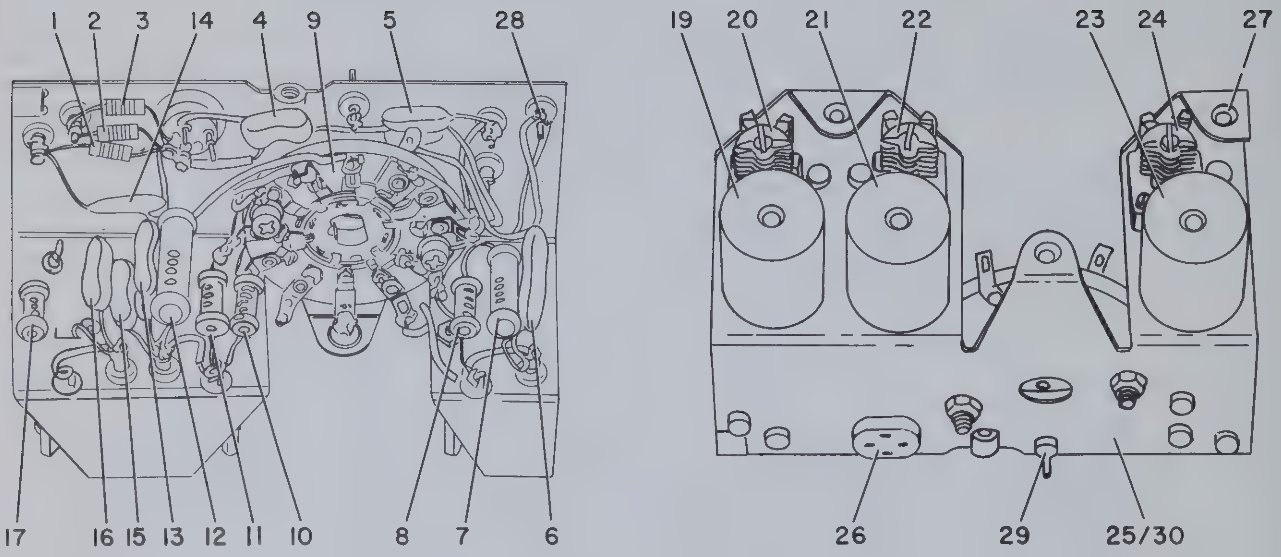
GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
	1109 20	X852	2	TRANSFORMER 81815 278-1841-000 T108	1	A
	20	X852	2	TRANSFORMER 81815 278-1841-000 T108	1	B,C
	21	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C24	2	
		P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
		545-7529-003	2	WASHER AP	2	
		P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
	22	X851-T10	2	TRANSFORMER 81815 278-1839-000 T107	1	A
	22	X851-T10	2	TRANSFORMER 81815 278-1839-000 T107	1	B,C
	23	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C23	1	
		P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
		545-7529-003	2	WASHER AP	2	
		P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
	24	X282-2	2	TRANSFORMER 81815 278-0745-000 T10 EFF THRU MCN 339	1	A
R	24	X851-T10	2	TRANSFORMER 81815 278-1839-010 T10 EFF MCN 340	1	A
	24	X282-2	2	TRANSFORMER 81815 278-0745-000 T10 EFF THRU MCN 846	1	B
R	24	X851-T10	2	TRANSFORMER 81815 278-1839-010 T10 EFF MCN 847	1	B
R	24	X851-T10	2	TRANSFORMER 81815 278-1839-010 T10	1	C
	25	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C26	1	
		P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
		545-7529-003	2	WASHER AP	2	
		P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
	26	X283-2	2	TRANSFORMER 81815 278-0746-000 T11	1	
	27	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C27	1	
		P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
		545-7529-003	2	WASHER AP	2	
		P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
	28	X284-3	2	TRANSFORMER 81815 278-0747-000 T12	1	
	29	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C28	1	
		P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
		545-7529-003	2	WASHER AP	2	
		P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1109 30	554-4706-004	2	SHIELD, MIXER		1	
	31	05-3307-01	3	SOCKET 91662 352-9902-000	XQ5	1	
		0004-7202S	3	RETAINER 91662 352-9904-000 AP		1	
	32	F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000		5	
	33	G2619	3	TERMINAL 21242 306-0324-000		5	
	34	G2522	3	TERMINAL 12615 306-0323-000		7	
	35	549-4164-004	3	SHIELD, MIXER		1	
R		R3484X1-8CAD PL	3	RIVET, TUBULAR, CAD. PL BRS, 0.152 DIA X 1/8 LG SHK 12014 305-0166-000 AP		2	
	36	549-4163-004	3	SHIELD, MIXER		1	
	1110 - 0	549-4172-004	1	OSCILLATOR, RF SEE FIG. 1101-64 FOR NHA		REF	
	1	RC07GF103K	2	RESISTOR, FXD, 10,000 OHMS 10%, 1/4 W 745-0785-000	R18	1	
	2	RC07GF273K	2	RESISTOR, FXD, 27,000 OHMS 10%, 1/4 W 745-0800-000	R20	1	
	3	RC07GF222K	2	RESISTOR, FXD, 2200 OHMS 10%, 1/4 W 745-0761-000	R19	1	
	4	CM05D270J03	2	CAPACITOR, FXD, 27 PF 5%, 500 VDCW 912-2774-000	C31	1	
	5	DM20F152J500 WV	2	CAPACITOR, FXD, 1500 PF 5%, 500 VDCW 72136 912-3327-000	C32	1	
	6	CM19D621F03	2	CAPACITOR, FXD, 620 PF 1%, 500 VDCW 72136 912-2984-000 EFF MCN 547 THRU 1687	C42	1	A
	6	CM06D102G03	2	CAPACITOR, FXD, 1000 PF 2%, 500 VDCW 912-3000-000 EFF MCN 1688	C42	1	A
	6	DM19F621F03	2	CAPACITOR, FXD, 620 PF 1%, 500 VDCW 72136 912-2984-000 EFF MCN 164 THRU 1084	C42	1	B
	6	CM06D102G03	2	CAPACITOR, FXD, 1000 PF 2%, 500 VDCW 912-3000-000 EFF MCN 1085	C42	1	B
	6	CM06D102G03	2	CAPACITOR, FXD, 1000 PF 2%, 500 VDCW 912-3000-000	C42	1	C
	7	DM19D561F03	2	CAPACITOR, FXD, 560 PF 1%, 500 VDCW 72136 912-2981-000 EFF MCN 547 THRU 1687 ONLY	C43	1	A
	7	DM19D561F03	2	CAPACITOR, FXD, 560 PF 1%, 500 VDCW 72136 912-2981-000 EFF MCN 164 THRU 1084 ONLY	C43	1	B
	8	CC20UJ100C	2	CAPACITOR, FXD, 10 PF 1/4 PF, 500 VDCW 916-0412-000 EFF THRU MCN 546	C45	1	A
R	8	301-000P3K0-100D	2	CAPACITOR, FXD, 10 PF 0.5 PF, 500 VDCW 72982 913-4611-000 EFF MCN 547 THRU 3313	C45	1	A
R	8	301N4200-85D EGC5PFP0RM-2 5PF	2	CAPACITOR, FXD, 5 PF 0.25PF, 500 VDCW 72982 913-1097-020 EFF MCN 3314	C45	1	A
	8	CC20UJ100C	2	CAPACITOR, FXD, 10 PF 1/4 PF, 500 VDCW 916-0412-000 EFF THRU MCN 163	C45	1	B

GROUP ASSEMBLY PARTS LIST



RF Oscillator
Figure 1110

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R	1110 8	301-000P3K0-100D		CAPACITOR, FXD, 10 PF 0.5 PF, 500 VDCW 72982 913-4611-000 EFF MCN 164 THRU 4726 C45	1	B
R	8	301N4200-85D EGC5PFP0RM-25PF	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-1097-020 EFF MCN 4727 C45	1	B
R	8	301-000P3K0-100D	2	CAPACITOR, FXD, 10 PF 0.5 PF, 500 VDCW 72982 913-4611-000 EFF THRU MCN 4726 C45	1	C
R	8	301N4200-85D EGC5PFP0RM-25PF	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-1097-020 EFF MCN 3314 C45	1	C
	9	235402FC	2	SWITCH SECTION 76854 269-2527-000 S1J	1	
		P313-0132-000	2	NUT, PLAIN, HEX., SST, 4-40 77250 313-0132-000 AP	2	
		8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP	4	
		310-0278-000	2	WASHER, LOCK, SST, 0.115 ID, 0.202 OD COML AP	2	
		541-5968-002	2	SPACER, SLV AP	2	

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
	1110	P347-0012-000	2	SCREW, MACH., SST, FIL H, 4-40 X 3/8 77250 347-0012-000 AP		2	
	10	301-000R3A0-509C	2	CAPACITOR, FXD, 5PF 0.25 PF, 500 VDCW 72982 913-4612-000 EFF THRU MCN 546 ONLY	C129	1	A
	10	301-000R3A0-509C	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-4612-000 EFF THRU MCN 163 ONLY	C129	1	B
R	10	CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000 EFF THRU MCN 4552	C37	1	A
R	10	CC20CH070D	2	CAPACITOR, FXD, 7 PF 1/2 PF, 500 VDCW 916-0126-000 EFF MCN 4553	C37	1	A
R	10	CC20CH100D	2	CAPACITOR, FXD, 10 PF 1/2 PF, 500 VDCW 916-0138-000 EFF THRU MCN 8068	C37	1	B,C
R	10	CC20CH070D	2	CAPACITOR, FXD, 7 PF 1/2 PF, 500 VDCW 916-0126-000 EFF MCN 8069	C37	1	B,C
	11	301-000P3K0-100D	2	CAPACITOR, FXD, 10 PF 0.5 PF 500 VDCW 72982 913-4611-000 EFF THRU MCN 546 ONLY	C41	1	A
	11	301-000P3K0-100D	2	CAPACITOR, FXD, 10 PF 0.5 PF, 500 VDCW 72982 913-4611-000 EFF THRU MCN 163 ONLY	C41	1	B
R	11	301N4200-85D EGC5PFPORM-2 5PF	2	CAPACITOR, FXD, 5 PF 0.25 PF, 500 VDCW 72982 913-1097-020 EFF MCN 1688	C41	1	A
R	11	301N4200-85D EGC5PFPORM-2	2	CAPCITOR, FXD, 5 PF .25 PF, 500 VDCW 72982 913-1097-020 EFF MCN 5204	C41 5PF	1	B,C
	12	CC32SH121G	2	CAPACITOR, FXD, 120 PF 20%, 500 VDCW 916-7322-000 EFF THRU MCN 546	C39	1	A
	12	CC32UJ361F	2	CAPACITOR, FXD, 360 PF 1%, 500 VDCW 916-7367-000 EFF MCN 547	C39	1	A
	12	CC32SH121G	2	CAPACITOR, FXD, 120 PF 20%, 500 VDCW 916-7322-000 EFF THRU MCN 163	C39	1	B
	12	CC32UJ361F	2	CAPACITOR, FXD, 360 PF 1%, 500 VDCW 916-7367-000 EFF MCN 164	C39	1	B
	12	CC32UJ361F	2	CAPACITOR, FXD, 360 PF 1%, 500 VDCW 916-7367-000	C39	1	C
	13	CC32CG510J	2	CAPACITOR, FXD, 51 PF 5%, 500 VDCW 916-7271-000 EFF THRU MCN 546	C43	1	A
	13	CM06FD431F03	2	CAPACITOR, FXD, 430 PF 1%, 500 VDCW 72136 912-2969-000 EFF MCN 547	C38	1	A
	13	CC32CG510J	2	CAPACITOR, FXD, 51 PF 5%, 500 VDCW 916-7271-000 EFF THRU MCN 163	C43	1	B
	13	CM19D431F03	2	CAPACITOR, FXD, 430 PF 1%, 500 VDCW 72136 912-2969-000 EFF MCN 164	C38	1	B
	13	CM19D431F03	2	CAPACITOR, FXD, 430 PF 1%, 500 VDCW 72136 912-2969-000	C38	1	C
	14	150D103X0035 A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF THRU MCN 1204	C10	1	A
	14	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 1205	C10	1	A

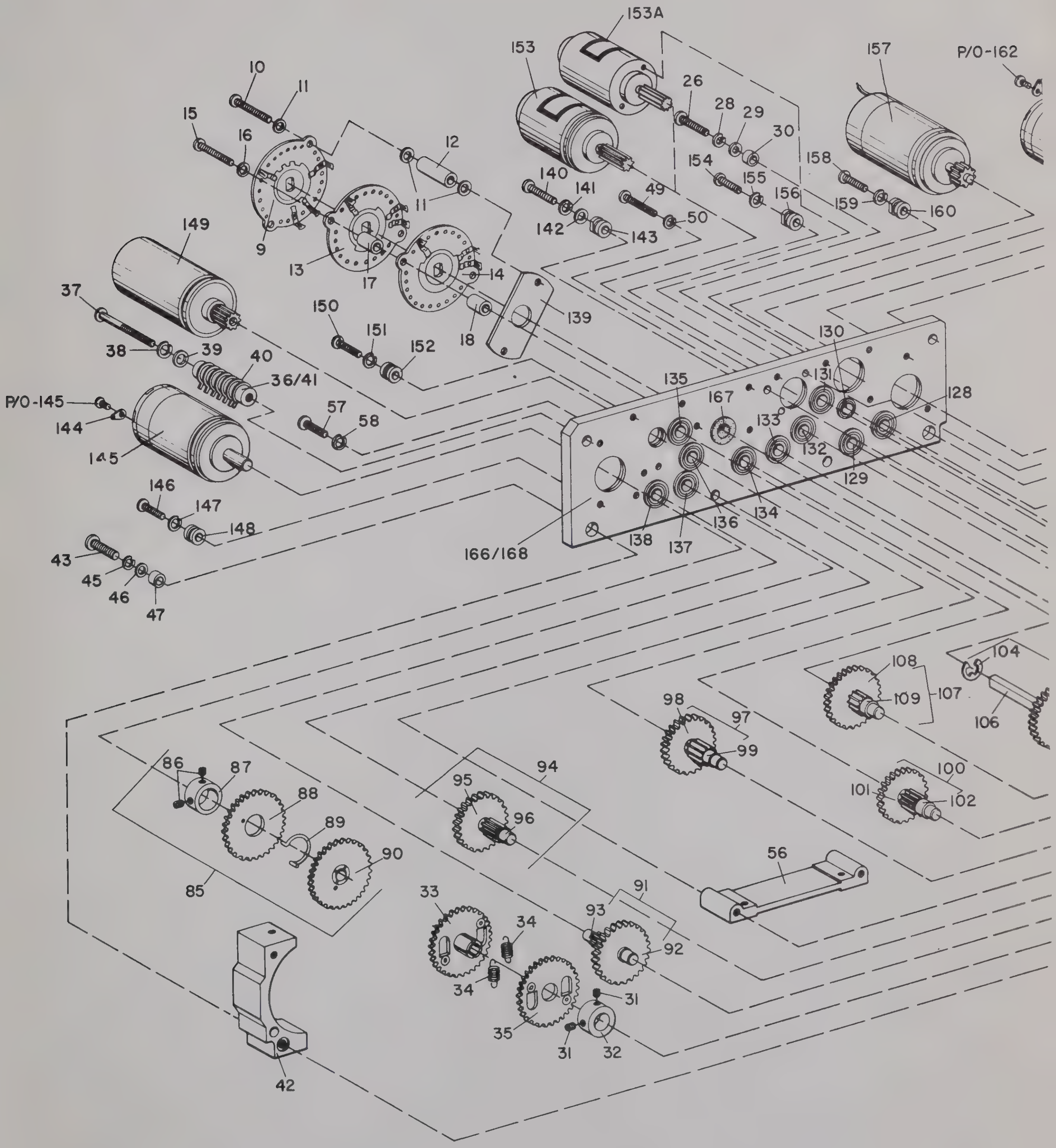
GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1110 14	150D103X0035A2	2	CAPACITOR, FXD, 0.01 UF 20%, 35 VDCW 56289 184-7670-000 EFF THRU MCN 692	C10	1	B
14	192P10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010 EFF MCN 693	C10	1	B
14	192D10392	2	CAPACITOR, FXD, 0.01 UF 10%, 200 VDCW 56289 933-1039-010	C10	1	C
15	CM05D151J03	2	CAPACITOR, FXD, 150 PF 5%, 500 VDCW 912-2828-000 EFF THRU MCN 546	C7	1	A
15	CM05D101J03	2	CAPACITOR, FXD, 100 PF 5%, 500 VDCW 912-2816-000 EFF MCN 547 THRU 1687 ONLY	C7	1	A
15	CM05D151J03	2	CAPACITOR, FXD, 150 PF 5%, 500 VDCW 912-2828-000 EFF THRU MCN 163	C7	1	B
15	CM05D101J03	2	CAPACITOR, FXD, 100 PF 5%, 500 VDCW 912-2816-000 EFF MCN 164 THRU 1084 ONLY	C7	1	B
16	CM05D271J03	2	CAPACITOR, FXD, 270 PF 5%, 500 VDCW 912-2846-000 EFF THRU MCN 546	C34	1	A
16	CC35UJ391F	2	CAPACITOR, FXD, 390 PF 1%, 500 VDCW 916-5241-000 EFF MCN 547 THRU 899	C34	1	A
16	CM05D391J03	2	CAPACITOR, FXD, 390 PF 5%, 500 VDCW 912-2858-000 EFF MCN 900 THRU 1687	C34	1	A
16	CM05D361J03	2	CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000 EFF MCN 1688	C34	1	A
16	CM05D271J03	2	CAPACITOR, FXD, 270 PF 5%, 500 VDCW 912-2846-000 EFF THRU MCN 163	C34	1	B
16	CC35UJ391F	2	CAPACITOR, FXD, 390 PF 1%, 500 VDCW 916-5241-000 EFF MCN 164 THRU 324	C34	1	B
16	CM05D391J03	2	CAPACITOR, FXD, 390 PF 5%, 500 VDCW 912-2858-000 EFF MCN 325 THRU 1084	C34	1	B
16	CM05D361J03	2	CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000 EF MCN 1085	C34	1	B
16	CM05D361J03	2	CAPACITOR, FXD, 360 PF 5%, 500 VDCW 912-2855-000	C34	1	C
17	CC30UJ131G	2	CAPACITOR, FXD, 130 PF 2%, 500 VDCW 916-4996-000 EFF THRU MCN 546	C35	1	A
17	CC20CK020D	2	CAPACITOR, FXD, 2 PF 1/2 PF, 500 VDCW 916-0076-000 EFF MCN 547 THRU 1689	C35	1	A
17	CC30UJ131G	2	CAPACITOR, FXD, 130 PF 2%, 500 VDCW 916-4996-000 EFF THRU MCN 163	C35	1	B
17	CC20CK020D	2	CAPACITOR, FXD, 2 PF 1/2 PF, 500 VDCW 916-0076-000 EFF MCN 164 THRU 1085	C35	1	B
17	301-000R3A0-150J	2	CAPACITOR, FXD, 15 PF 5%, 500 VDCW 72982 913-4613-000	C35	1	
18		1	DELETED			
19	X270-2	2	COIL ASSY, RF 81815 278-1807-000	L3	1	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1110 20	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C36	1	
	P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
	545-7529-003	2	WASHER AP	2	
	P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
21	X271-2	2	COIL ASSY, RF 81815 278-1806-000 L4	1	
22	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C40	1	
	P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
	545-7529-003	2	WASHER AP	2	
	P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
23	X272-2	2	COIL ASSY, RF 81815 278-1805-000 L5	1	
24	189-6-8	2	CAPACITOR, VAR, 1.98 TO 12.4 PF, 850 PEAK VOLTAGE 74970 922-0565-000 C44	1	
	P313-0166-000	2	NUT, PLAIN, HEX., NI PL BRS, 0-80 77250 313-0166-000 AP	2	
	545-7529-002	2	WASHER AP	2	
	P321-0293-000	2	SCREW, MACH., NI PL BRS, SLOT. FIL H, 0-80 X 5/16 77250 321-0293-000 AP	2	
25	549-4145-003	2	SHIELD, OSC	1	
26	05-3307-001	3	SOCKET 91662 352-9902-000 XQ6	1	
	0004-72023	3	RETAINER 91662 352-9904-000 AP	1	
27	F22NCFMA1-40	3	NUT, SELF-LKG, CLINCH, CAD. PL STL, 4-40 72962 333-0839-000	3	
28	G2619	3	TERMINAL 21242 306-0324-000	8	
29	G2522	3	TERMINAL 12615 306-0323-000	1	
30	549-4161-004	3	SHIELD, OSC	1	
1111 - 0	549-4187-005	1	GEARCASE, MOTOR SEE FIG. 1101-67 FOR NHA	REF	
1	549-4114-003	2	COVER, GEARSHAFT	1	
2	MS51957-26	2	SCREW, MACH., SST, PAN HD, 6-32 X 1/4 343-0167-000 AP	2	
3	MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	2	
4	P347-0005-000	2	SCREW, MACH., SST, FIL H, 4-40 X 3/16 77250 347-0005-000	2	
5	310-3340-000	2	WASHER, LOCK, SST, 0.125 ID, 0.187 OD COML	2	
6	A201-5W	2	COUPLING 99934 015-0514-000	1	
7	549-4118-002	2	SPRING, HELICAL, EXTENSION AP	1	
8	MS51053-426	2	SETSCREW, CAD. PL STL, 6-32 X 1/8 335-0003-000 AP	4	
9	235797K	2	SWITCH SECTION 76854 269-2525-000 S1M	1	

GROUP ASSEMBLY PARTS LIST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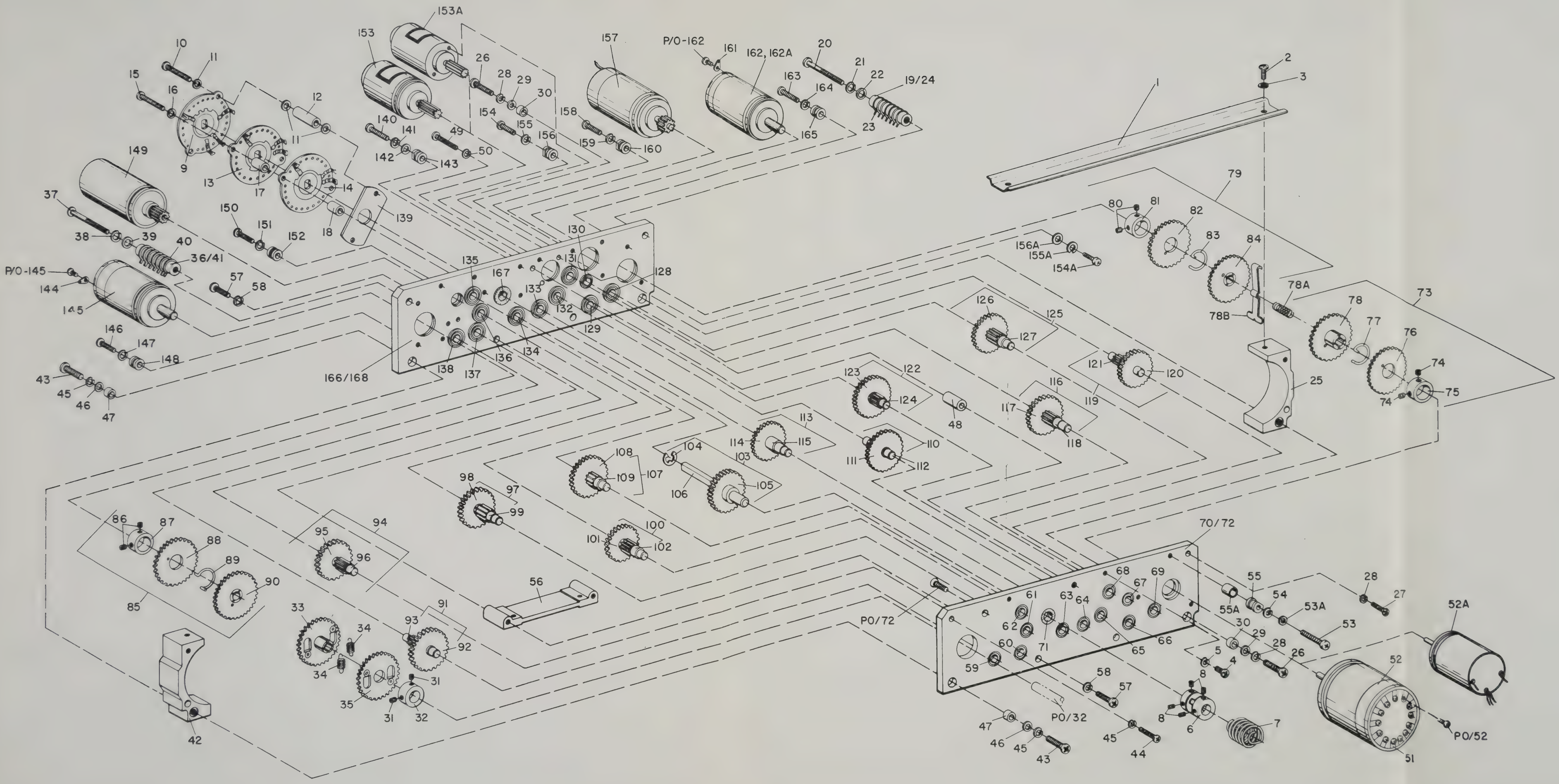
Motor Gearcase
Figure 1111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Motor Gearcase
Figure 1111

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1111 10	P347-0014-000	2	SCREW, MACH., SST, FIL H, 4-40 X 1 77250 347-0014-000 AP	2	
11	8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP	6	
12	541-5995-002	2	SPACER, SLV AP	2	
13	235796K	2	SWITCH SECTION 76854 269-2522-000 S1L	1	
14	235798K	2	SWITCH SECTION 76854 269-2526-000 S1K	1	
15	P347-0013-000	2	SCREW, MACH., SST, FIL H, 4-40 X 7/8 77250 347-0013-000 AP FOR 13 AND 14	2	
16	8942	2	WASHER, NM, PHEN, 0.116 ID, 0.187 OD 76854 302-0262-000 AP FOR 13 AND 14	2	
17	541-5966-002	2	SPACER, SLV AP FOR 13 AND 14	2	
18	541-5968-002	2	SPACER, SLV AP FOR 13 AND 14	2	
19	549-4151-003	2	POST, MULTI-TERMINAL	1	
20	P347-0045-000	2	SCREW, MACH., SST, FIL H, 6-32 X 1-1/2 77250 347-0045-000 AP	1	
21	MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	1	
22	310-0046-000	2	WASHER, FLAT, SST, 0.147 ID, 0.312 OD COML AP	1	
23	1594-3	3	TERMINAL 71279 306-0212-000	5	
24	549-4120-002	3	INSULATOR, SLV	1	
25	549-4140-003	2	HOUSING, GEARCASE	1	
26	MS51957-30	2	SCREW, MACH., SST, PAN HD, 6-32 X 1/2 343-0171-000 AP	2	
27	MS51957-28	2	SCREW, MACH., SST, PAN HD, 6-32 X 3/8 343-0169-000 AP	1	
28	MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	3	
29	310-0046-000	2	WASHER, FLAT, SST, 0.147 ID, 0.312 OD COML AP	2	
30	549-4113-002	2	DOWEL, TUBULAR AP	2	
31	335-0022-000	2	SETSCREW, SST, 6-40 X 1/8 COML AP	2	
32	542-6624-002	2	COLLAR	1	
33	549-4137-003	2	GEAR, SPUR, 84 TEETH	1	
34	546-8145-002	2	SPRING, EXTENSION	2	
35	549-4138-003	2	GEAR, SPUR, 84 TEETH	1	
36	549-4151-003	2	POST, MULTI-TERMINAL	1	
37	P347-0045-000	2	SCREW, MACH., SST, FIL H, 6-32 X 1-1/2 77250 347-0045-000 AP	1	
38	MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	1	
39	310-0046-000	2	WASHER, FLAT, SST, 0.147 ID, 0.312 OD COML AP	1	
40	1594-3	3	TERMINAL 71279 306-0212-000	5	
41	549-4120-002	3	INSULATOR, SLV	1	
42	549-4140-003	2	HOUSING, GEARCASE	1	
43	MS51957-30	2	SCREW, MACH., SST, PAN HD, 6-32 X 1/2 343-0171-000 AP	2	
44	MS51957-28	2	SCREW, MACH., SST, PAN HD, 6-32 X 3/8 343-0169-000 AP	1	
45	MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	3	
46	310-0046-000	2	WASHER, FLAT, SST, 0.147 ID, 0.312 OD COML AP	2	

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
	1111 47	549-4113-002	2	DOWEL, TUBULAR AP	2	
	48	549-4112-002	2	SPACER, SLV	1	
	49	MS51957-34	2	SCREW, MACH., SST, PAN HD, 6-32 X 1 343-0176-000 AP	1	
	50	MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	1	
R	51	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 EFF THRU MCN 1171 ONLY	7	A
R	51	SPL4040-4HOT TINNED	2	TERMINAL 77147 304-0332-000 EFF THRU MCN 635 ONLY	1	B
R	52	EWC15A5A196	2	SYNCHRO 86197 229-6000-000 EFF THRU MCN 1171 B3	1	A
R	52	EWC15A5A196	2	SYNCHRO 86197 229-6000-000 EFF THRU MCN 635 B3	1	B
R	52A	10FB1A	2	RESOLVER SCOTT, INC., 229-7027-010 EFF MCN 1172 THRU 3822 SB 32 B3	1	A
R	52A	229-7027-030	2	RESOLVER, ELECTRICAL SCOOT, INC. EFF MCN 3823 SB 34 B3	1	A
R	52A	10FB1A	2	RESOLVER SCOTT, INC., 229-7027-010 EFF MCN 693 THRU 6573 SB 32 B3	1	B
R	52A	229-7027-030	2	RESOLVER, ELECTRICAL SCOTT, INC. EFF MCN 6574 SB 34 B3	1	B
R	52A	10FB1A	2	RESOLVER SCOTT, INC., 229-7027-010 EFF THRU MCN 6573 SB32 B3	1	C
R	52A	229-7027-030	2	RESOLVER, ELECTRICAL SCOTT, INC. EFF MCN 6574 SB 34 B3	1	C
R	53	MS51957-17	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/2 343-0137-000 EFF THRU MCN 1171 AP	3	A
R	53	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 EFF MCN 1172 SB 32 AP	3	A
R	53	MS51957-17	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/2 343-0137-000 EFF THRU MCN 635 AP	3	B
R	53	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 EFF MCN 636 SB 32 AP	3	B
R	53	MS51957-13	2	SCREW, MACH., SST, PAN HD, 4-40 X 1/4 343-0133-000 SB 32 AP	3	C
R	53A	310-6340-000	2	WASHER, FLAT, SST, 0.125 ID, 0.281 OD COML EFF MCN 1172 AP	3	A
R	53A	310-6340-000	2	WASHER, FLAT, SST, 0.125 ID, 0.281 OD COML EFF MCN 636 AP	3	B
	53A	310-6340-000	2	WASHER, FLAT, SST, 0.125 ID, 0.281 OD COML AP	3	C
	54	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP	3	
R	55	549-4109-002	2	CLAMP, RIM CLENCHING EFF THRU MCN 1171 AP	3	A
R	55	549-4109-002	2	CLAMP, RIM CLENCHING EFF THRU MCN 635 AP	3	B
R	55	777-0901-001	2	CLAMP, RESOLVER EFF MCN 1172 SB 32 AP	3	A
R	55	777-0901-001	2	CLAMP, RESOLVER EFF MCN 636 SB 32 AP	3	B
	55	777-0901-001	2	CLAMP, RESOLVER AP	3	C

GROUP ASSEMBLY PARTS LIST

	FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
R	1111 55A	763-2532-001	2	SPACER EFF MCN 1172 AP	3	A
R	55A	763-2532-001	2	SPACER EFF MCN 636 AP	3	B
	55A	763-2532-001	2	SPACER AP	3	C
	56	549-4111-002	2	SIDE PLATE, GEARCASE	1	
	57	MS51957-28	2	SCREW, MACH., SST, PAN HD, 6-32 X 3/8 343-0169-000 AP	4	
	58	MS35338-136	2	WASHER, LOCK, SST, 0.141 ID, 0.253 OD 310-0282-000 AP	4	
	59	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	60	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	61	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	62	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	63	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	64	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	65	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	66	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	67	S418FCHH3P15 L02	2	BEARING 40920 309-1518-000	1	
	68	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	69	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	70	549-4156-004	2	PLATE, GEAR	1	
	71	F358MILL6085 A	3	BEARING 70417 309-0116-000	1	
	72	549-4155-004	3	PLATE, GEAR	1	
	73	549-4123-003	2	GEAR ASSY, SPUR	1	
	74	MS51053-112	3	SETSCREW, CAD. PL STL, 4-40 X 1/8 328-0371-000	2	
	75	549-4107-002	3	COLLAR, GEAR	1	
	76	549-4084-002	3	GEAR, SPUR, 95 TEETH	1	
	77	542-4177-002	3	SPRING, LOAD	1	
	78	549-4128-003	3	GEAR, SPUR, 95 TEETH	1	
R	78A	553-9420-003	2	SPRING, HELICAL, COMPRESSION EFF THRU MCN 1171	1	A
R	78A	553-9420-003	2	SPRING, HELICAL, COMPRESSION EFF THRU MCN 635	1	B
R	78B	763-5762-001	2	CONTACT, ELECTRICAL EFF MCN 1172	1	A
R	78B	763-5762-001	2	CONTACT, ELECTRICAL EFF MCN 636	1	B
	78B	763-5762-001	2	CONTACT, ELECTRICAL	1	C
	79	549-4123-003	2	GEAR ASSY, SPUR	1	
	80	MS51053-112	3	SETSCREW, CAD. PL STL, 4-40 X 1/8 328-0371-000	2	
	81	549-4107-002	3	COLLAR, GEAR	1	
	82	549-4084-002	3	GEAR, SPUR, 95 TEETH	1	
	83	542-4177-002	3	SPRING, LOAD	1	
	84	549-4128-003	3	GEAR, SPUR, 95 TEETH	1	
	85	549-4124-002	2	GEAR ASSY, SPUR	1	
	86	MS51053-112	3	SETSCREW, CAD. PL STL, 4-40 X 1/8 328-0371-000	2	
	87	549-4107-002	3	COLLAR, GEAR	1	
	88	549-4106-002	3	GEAR, SPUR, 84 TEETH	1	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM		PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1111	89	542-4177-002	3	SPRING, LOAD	1	
	90	549-4139-003	3	GEAR, SPUR, 84 TEETH	1	
	91	549-4105-002	2	GEARSHAFT, SPUR	1	
	92	549-4104-002	3	GEAR, SPUR, 80 TEETH	1	
	93	549-4136-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	94	549-4088-002	2	GEARSHAFT, SPUR	1	
	95	549-4087-002	3	GEAR, SPUR, 65 TEETH	1	
	96	549-4130-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	97	549-4103-002	2	GEARSHAFT, SPUR	1	
	98	549-4087-002	3	GEAR, SPUR, 65 TEETH	1	
	99	549-4135-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	100	549-4102-002	2	GEARSHAFT, SPUR	1	
	101	549-4101-002	3	GEAR, SPUR, 50 TEETH	1	
	102	549-4131-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	103	549-4100-002	2	GEARSHAFT, SPUR	1	
	104	5133-25C	2	RING 79136 340-0254-000 AP	1	
	105	549-4098-002	3	GEAR, SPUR, 48 TEETH	1	
	106	549-4099-002	3	SHAFT, STR	1	
	107	549-4097-002	2	GEARSHAFT, SPUR	1	
	108	549-4096-002	3	GEAR, SPUR, 64 TEETH	1	
	109	549-4134-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	110	549-4094-002	2	GEARSHAFT, SPUR	1	
	111	549-4093-002	3	GEAR, SPUR, 60 TEETH	1	
	112	549-4132-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	113	549-4095-002	2	GEARSHAFT, SPUR	1	
	114	549-4093-002	3	GEAR, SPUR, 60 TEETH	1	
	115	549-4133-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	116	549-4092-002	2	GEARSHAFT, SPUR	1	
	117	549-4091-002	3	GEAR, SPUR, 49 TEETH	1	
	118	549-4132-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	119	549-4086-002	2	GEARSHAFT, SPUR	1	
	120	549-4085-002	3	GEAR, SPUR, 70 TEETH	1	
	121	549-4129-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	122	549-4126-002	2	GEARSHAFT, SPUR	1	
	123	549-4125-002	3	GEAR, SPUR, 61 TEETH	1	
	124	549-4130-003	3	GEARSHAFT, SPUR, 17 TEETH	1	
	125	549-4090-002	2	GEARSHAFT, SPUR	1	
	126	549-4089-002	3	GEAR, SPUR, 60 TEETH	1	
	127	549-4152-003	3	GEARSHAFT, SPUR, 21 TEETH	1	
	128	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	129	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	130	S418FCHH3P15 L02	2	BEARING 40920 309-1518-000	1	
	131	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	132	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	133	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	134	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	135	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	136	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	
	137	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000	1	

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE		UNITS PER ASSY.	USAGE CODE
1111 138	S518FCHH3P15 L02	2	BEARING 40920 309-1519-000		1	
139	549-4110-002	2	PLATE, SWITCH MTG		1	
140	MS51957-15	2	SCREW, MACH., SST, PAN HD, 4-40 X 3/8 343-0135-000 AP		2	
141	MS35338-135	2	WASHER, LOCK, SST, 0.115 ID, 0.212 OD 310-0279-000 AP		2	
142	502-1515-002	2	WASHER AP		2	
143	549-4121-002	2	CLAMP, RIM CLENCHING AP		2	
144	SPL4040-2HOT TINNED	2	TERMINAL 77147 304-0331-000		5	
145	ETH11E4	2	SYNCHRO 86197 229-5003-000 OR	B1	1	
145	7RS900-3A	2	SYNCHRO 88818 229-5004-000	B1	1	
146	MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP		3	
147	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP		3	
148	542-4160-002	2	CLAMP, RIM AP		3	
149	665-55-84-1	2	MOTOR 72568 229-2004-000 OR	MG1	1	
149	ST10009-4	2	MOTOR 03998 229-2005-000 OR	MG1	1	
149	6229-70-02	2	MOTOR 77045 229-2042-010	MG1	1	
150	MS51957-5	2	SCREW, MACH., PAN HD, 2-56 X 3/8 343-0126-000 AP		3	
151	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP		3	
152	544-3541-002	2	CLAMP, RIM AP		3	
153	41A330	2	MOTOR 25140 230-0390-000 OR	B2	1	
	41A144	2	MOTOR 25140 230-0257-000	B2	1	
154	MS51957-4	2	SCREW, MACH., PAN HD, 2-56 X 5/16 343-0125-000 EFF THRU MCN 1359 AP		2	A
154	MS51957-4	2	SCREW, MACH., SST, PAN HD, 2-56 X 5/16 343-0125-000 EFF THRU MCN 761 AP		2	B
154A	P347-0023-000	2	SCREW, MACH., SST, FIL H, 2-56 X 5/16 77250 347-0023-000 EFF MCN 1359 AP		2	A
154A	P347-0023-000	2	SCREW, MACH., SST, FIL H, 2-56 X 5/16 77250 347-0023-000 EFF MCN 762 AP		2	B
154A	P347-0023-000	2	SCREW, MACH., SST, FIL H, 2-56 X 5/16 77250 347-0023-000 AP		2	C
155	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 EFF THRU MCN 1431 AP		2	A
155	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 EFF THRU MCN 799 AP		2	B
155A	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 EFF MCN 1432 AP		2	A
155A	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 EFF MCN 800 AP		2	B
155A	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP		2	C

GROUP ASSEMBLY PARTS LIST

FIG. - ITEM	PART NO.	INDENT.	NOMENCLATURE	UNITS PER ASSY.	USAGE CODE
1111 156	549-4108-002	2	CLAMP, RIM CLENCHING EFF THRU MCN 1358 ONLY AP	2	A
156	549-4108-002	2	CLAMP, RIM CLENCHING EFF THRU MCN 761 ONLY AP	2	B
156A	310-0044-000	2	WASHER, FLAT, SST, 0.093 ID, 0.250 OD COML EFF MCN 1359 AP	2	A
156A	310-0044-000	2	WASHER, FLAT, SST, 0.093 ID, 0.250 OD COML EFF MCN 762 AP	2	B
156A	310-0044-000	2	WASHER, FLAT, SST, 0.093 ID, 0.250 OD COML AP	2	C
157	665-054-262A	2	MOTOR 72568 229-1000-000 B5 OR	1	
157	S11014-4	2	MOTOR 03998 229-1001-000 EFF MCN 1444 B5	1	
158	MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP	2	
159	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP	2	
160	542-4160-002	2	CLAMP, RIM AP	2	
161	SPL4040-2HOT TINNED	2	TERMINAL 77147 304-0331-000 EFF THRU MCN 1212	5	A
161	SPL4040-2HOT TINNED	2	TERMINAL 77147 304-0331-000 EFF THRU MCN 727	1	B
162	EGH11G4A521	2	SYNCHRO 86197 229-3003-000 EFF THRU MCN 1212 B4	1	A
162	EGH11G4A521	2	SYNCHRO 86197 229-3003-000 EFF THRU MCN 727 B4	1	B
162A	TGH11E4B080	2	SYNCHRO 86197 229-3045-010 EFF MCN 1213 B4	1	A
162A	TGH11E4B080	2	SYNCHRO 86197 229-3045-010 EFF MCN 728 B4	1	B
162A	TGH11E4B080	2	SYNCHRO 86197 229-3045-010 B4	1	C
163	MS51957-5	2	SCREW, MACH., SST, PAN HD, 2-56 X 3/8 343-0126-000 AP	3	
164	MS35338-134	2	WASHER, LOCK, SST, 0.088 ID, 0.175 OD 310-0275-000 AP	3	
165	542-4160-002	2	CLAMP, RIM AP	3	
166	549-4158-004	2	PLATE, GEAR	1	
167	309-0118-000	3	BEARING, SLV 12204	1	
168	549-4157-004	3	PLATE, GEAR	1	

COLLINS